The Builder.

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ILLUSTRATIONS.

West Front, Beverley Minster.....Drawn by Mr. J. B. Fulton.
University College Schools, Hampstead.....Mr. Arnold Mitchell, F.R.I.B.A., Architect.
Section of S. Irene, Constantinople.....From a Drawing.
Metropolitan Asylums Board: Principal Entrance.....Mr. E. T. Hall, F.R.I.B.A., Architect.
Wrought Iron Gates, Worsley Hall.....Designed by Mr. F. F. Glennie.
Old Lead Spout heads, Bolton Hall.....From Photographs.

Illustrations in Text.

Plan of Temple of Minerva Medica ..... Page 110
Examples of Wrought-Iron Work:—
Drayton House: Detail of One Half of Top of Gate to Bowling Green..... Page 111
Examples of Wrought-Iron Work (*contd.*):—
Traquair House, Peeblesshire: Gateway at Avenue, etc. ..... Page 112
Illustrations to Student's Column ..... Page 125

CONTENTS.

	PAGE
Byzantine, Romanesque, and Gothic Architecture	109
Examples of Wrought-Iron Work	111
Notes	112
Letter from Paris	114
The Architectural Association	115
The Architectural Association Spring Visits	119
The Surveyors' Institution	119
Portland Cement	121
The London County Council	121
Fifty Years Ago	122
Illustrations:—	
West Front, Beverley Minster	122
University College Schools, Hampstead	122
Illustrations (*contd.*):—	
Section of S. Irene, Constantinople	122
Metropolitan Asylums Board Offices: Principal Entrance	122
Gates, Worsley Hall	122
Old Lead Spout Heads, Bolton Hall	122
Applications under the London Building Act, 1894	123
Architectural Societies	123
Competitions	124
Books Received	124
Correspondence:—	
Registration and the Status of Architects	124
Westminster City Council	124
The Student's Column	124
General Building News	126
Sanitary and Engineering News	127
Miscellaneous	127
Legal:—	
Case under the London Building Act	128
Combined Drainage Dispute	128
Costs in an Action for Dilapidations	128
Patents	128
Some Recent Sales	129
Meetings	130
Prices Current	130
Tenders	131

Byzantine, Romanesque, and Gothic Architecture.

IN Professor Lethaby's recently published volume on "Mediæval Art"* an attempt is made to deal in the space of a single volume with the whole subject of the architecture and art of the Middle Ages, from A.D. 312 to A.D. 1350, *i.e.*, from the Peace of the Church to the eve of the Italian Renaissance. The book is characterised by the fulness of knowledge and diligent research which one expects from the author. His statements are based on the most recent publications of Continental scholars. It is a refreshing contrast to the normal insularity of English archæological literature.

Nearly half the volume is devoted to the elucidation of the development of architecture and art in the six centuries from A.D. 300 to A.D. 900. Of these six centuries the first 250 years were in the east of Europe a period of great architectural and artistic achievement. Then it was that there arose, culminating in the days of the world's greatest builder, the Emperor Justinian, the famous Byzantine art, whose worthiest representative is still to be seen in S. Sophia. To the great Byzantine works of this period Professor Lethaby's introductory chapters are an admirable guide. In his previous work on S. Sophia he had thoroughly familiarised himself with the architecture of the VIth century; his present volume brings his knowledge up to date, corrected and reinforced in the light of modern discussions.

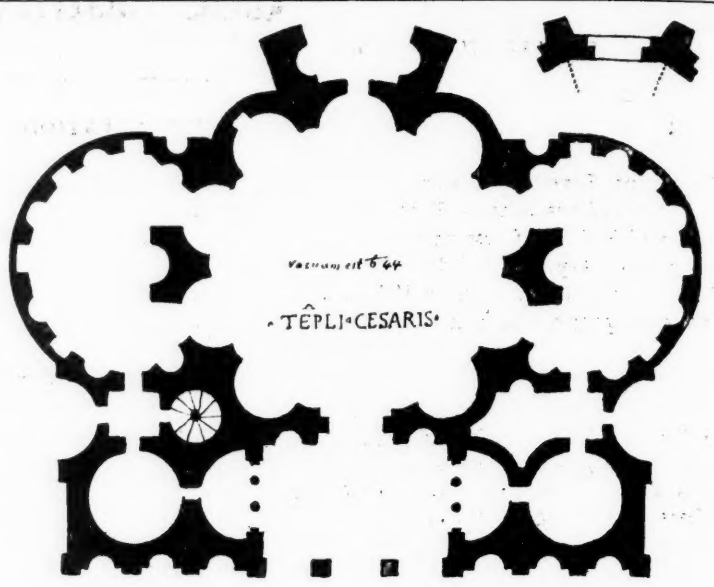
In dealing with this or any other subject the first thing is to define one's terms. Allow a man to frame his own definitions of capital, wealth, rent, and the like, and he weaves a logical web of Political Economy from which there is no escape. So it is with the terms of archæology. Before we can deal with Byzantine work it is necessary to have it defined. What is it? We are told that "it is developed out of the Hellenistic art as Romanesque is generally supposed to have developed from Roman." That may be so, if in the term "art" we do not include architecture; or if we include only architectural detail, carved caps and friezes, and mouldings and the like, which only too many architects imagine to be architecture. But architecture proper is the planning of buildings and the putting up of buildings in such fashion that they will stand in spite of the thrusts of vaults and roofs. In this, the proper sense of the term, surely Byzantine architecture has singularly little to do with Hellenistic architecture. The details of S. Sophia, St. Mark, and the rest are, we grant, mainly Greek in origin. But architecture, as we have said, is not details. In all the essential parts of planning and construction what possible connexion can there be between S. Sophia and the Parthenon? In plan they are as dissimilar as two buildings well can be; one is of solid marble, the other of brick, tile, and concrete veneered with marble and mosaic; one is trabeated, the other arcuated in construction; one has wooden roofs, the other has domes, semi-domes, barrel vaults, groined vaults, with all the apparatus of abutment necessary to stop their thrusts. Can two buildings be less alike in essentials? What matter though the acanthus is a *motif* in the capitals of both, and that both rejoice in bands of egg-and-tongue ornament?

Professor Lethaby would rechristen Byzantine "Hellenesque." A more misleading epithet could hardly be invented. It is not to Athens, but to Rome that Byzantine architecture owes paternity. Take the plan, a very remarkable one, of S. Sophia itself. There is no need to go to the Greeks for it. Professor Lethaby reproduces a diagram of the Nymphæum, which goes by the name of the Temple of Minerva Medica, at Rome; it was built about A.D. 260 (see next page). This building had a central dome, abutment for which was provided by flanking it with two lower semi-domes. This is precisely the method of abutment at S. Sophia, and of the characteristic Byzantine churches. The chief factor of Byzantine building, as the author rightly observes, is domical vaulting, the domes or vaults being shells of brick-concrete, which are homogeneous with the walls; widespreading rather than high, and covered on the outside with lead. This concentric type of plan naturally resulted from the use of the dome; the parts around the middle

* "Mediæval Art." By W. R. Lethaby. London: Duckworth. 1904.

spaces being so disposed as to spread the weight of the central dome over a wide area, and gradually diminishing in height. Even earlier than the Temple of Minerva Medica is the Syrian church of Kusr-en-Nueijis, described in the author's earlier book on S. Sophia as Roman work of the IInd century. Inside it has a dome on pendentives over a square area, counterpoised by four tunnel vaults. It is S. Sophia in miniature. It is illustrated in the "Eastern Palestine Memoirs" for 1889, page 132. With such Roman origins for S. Sophia, it seems perverse to style it either Neo-Hellenic or Mediæval Greek with M. Bayet, or Hellenesque with Professor Lethaby. Professor Bury was nearer the mark in designating it "Romaic." It is nothing but Roman work, modified for the purposes of the Greek Church; only by Roman architecture is to be understood not the spurious semi-Greek architecture of the temple, introduced into Rome by *dilettanti* and *virtuosi*, patronised and fostered by such people as Cicero, but the genuine, indigenous Roman architecture of the IInd century, in brick and concrete, not in stone, with its building processes conditioned by the almost exclusive employment of unskilled labour. These were the materials and processes that upreared the Pantheon in the IInd century, and these, developed, of course, and improved in the course of four intervening centuries, built S. Sophia. Byzantine architecture is nothing but Roman architecture developed and, moreover, greatly beautified in Hellenistic hands. Just so Lombardic is but Roman work imitated and adapted by Teutonic immigrants long settled in Northern Italy. Norman is Roman work imitated and developed by people of Teutonic race settled first in Scandinavia, then in Normandy, then in England; and so with all other branches of the great Romanesque style. In fact, if we must have a new terminology, let us dub Byzantine in future Eastern Romanesque—certainly not Hellenesque. It is but the elder brother of the Romanesques of Lombardy, Germany, Provence, Auvergne, Poitou, Spain, Normandy, and England. It had the good hap to fall on favourable soil; its noblest works had for paymaster an Emperor who had at his disposal the wealth of both the Roman worlds. Western Romanesque had to wait for centuries before those poor savages, the Goths and Vandals and Visigoths and Normans and English, were in a position to work out an architecture. So Eastern Romanesque got ahead of the rest. Western Romanesque did not culminate till the Amiens or Exeter of the XIIIth century. The grand climacteric of Eastern Romanesque was the completion of S. Sophia in A.D. 537, nearly 800 years before Amiens Cathedral was begun.

The great Byzantine period was that of the VIth century, that of Justinian. But there was a revival of prosperity and a renaissance of Byzantine art in the XIth century, the culmination of which is seen in the remodelling of St. Mark's, Venice. So marked in this period is the influence of the Armenian churches, *e.g.*, those of Ani, that the work may well be called Armenian Byzantine. By that time "the government, commerce, and



Plan of Temple of Minerva Medica.

industry had been invaded by Oriental and barbarous elements; the throne and the army had become the prey of Armenians and Slavs. The sculptured slabs of Georgia and the gates of the Armenian churches decorated with arabesques offer direct correspondence with Byzantine works. The Christian Orient and Constantinople reformed the architecture in the same sense. Hence the picturesque narrow corridors, tall tambours, and barbarous ornament." The later Byzantine churches are usually small, *e.g.*, the Athens Cathedral; their domes are raised high on drums, and partake of the character of central round towers, and the external surfaces are much ornamented with patterns formed in the brickwork. A prototype of this class of church is S. Irene, Constantinople, of which we give a section (see lithograph). It was built by Constantine and rebuilt by Justinian, whose monogram may be seen on some of the capitals. Rivoira is of opinion that as we see it now it is a work of the VIIIth century; the lantern-drum certainly is of late character.

The next chapters of the book deal with the difficult subject of Western Romanesque. Probably the time has not yet come when a final classification of its varieties can be established and their filiation determined. It might be well meanwhile not to speak of "French Romanesque." There is no such thing. There is one Romanesque in Burgundy, another in Auvergne, another in Périgueux, and several more. The Romanesque of Burgundy is far more unlike that of Périgueux than German is unlike Lombardic work. As regards the last two, the author commits himself to the thesis that German Romanesque is derived from Lombardy. A German archæologist would be able to adduce some strong evidence that the reverse is the case. Nor can Ruprich-Robert's view be regarded as proved, that Norman is derived from Lombardic. Norman is as much like German Romanesque as it is like Lombardic, and the geographical difficulties are far less in affiliating Norman and German Romanesque, whose boundaries were largely coterminous. The author admits, indeed, that in the north of France to the very end of the XIIth century there is marked German influence in the planning and in the tower-groups of Tournay, Soissons, Noyon, Valenciennes, and Chaalis. As for the Lombardic origin of Norman Romanesque, it hardly seems possible to attribute it to Lanfranc. He did not become Prior of Bec till 1045, and a considerable time must be supposed to have elapsed before he obtained such power in the ducal court of Normandy as to be able to introduce an alien style of architecture into the country. No theory can be held adequate which does not account for the great abbey church of Jumièges, recently illustrated in these pages. Jumièges, with its alternation of compound piers and cylinders and vaulted triprium chamber, smacks of Lombardy more than any later church. But it was begun five years before Lanfranc came to Bec. Lanfranc, then, can have had nothing to do with the Lombardic design of Jumièges. On page 132 another statement should be corrected. Counterbutting arches are stated to exist in the triforium chambers of Gloucester choir and Norwich, intended to resist the thrusts of the vaults that were contemplated. As a matter of fact, there are not, and never were, any such arches at Norwich, but supports were provided for internal flying buttresses. Whether such were ever constructed cannot now be determined. At Gloucester the abutment consists of a demi-berceau strengthened by ribs.

On Gothic Professor Lethaby writes with enthusiasm and eloquence. We wish we had space for quotations. A long account is given of Gothic in France. This, however, has been done before again and again. We think it is a mistake to identify French Gothic with the Gothic of the Ile de France. The space that has been expended on a detailed description of the Northern Gothic cathedrals might well have been devoted to what nobody yet has worked out, viz., French Gothic other than that of the Ile de France; the Gothics of Burgundy, Normandy, Brittany, the Plantagenet Gothic of Anjou, the hall-churches of the South. These are still unsung, and are full of beauty and interest. We are a little weary of Amiens and Rheims, and should like to have Coutances, Semur-en-Auxois, Poitiers Cathedral, Albi, analysed and described.

Of English Gothic the treatment is very inadequate; it is despatched in eight pages. We venture to think also that it is thoroughly erroneous, if the result of the author's Continental experiences is to convince him that "if the Gothic of England comes next to that of the Ile de France, it is because England was so far French"; or that "English Gothic is but a provincial variety of the great ogival style, a *patois*—it is a decorative form of French art"; or that "Gothic art in England was a true development *continuously* influenced from France—at any rate, till the building of Westminster." So speaks the Professor *ex cathedrâ*; he gives no reasons. Without such reasons we would not accept such assertions, not even from a whole university of professors. We assert ourselves, also without reasons, not having space to state them here, that all this pedigree-hunting is the merest futility; that the builders of Lincoln and Coutances, and Semur and Albi, and Ulm and Segovia worked out their artistic salvation almost wholly in independence one of the other, just as did the builders of the Ile de France; that the different schools are sister schools with parallel development, not daughters of a Parisian dam; and that if we in England took a few hints from Canterbury choir, the French took several from the octagon and choir and Lady Chapel of Ely. Nor do we believe for one moment that "the causes which underlay Gothic art are to be found in a long infiltration of the Oriental spirit to the point of saturation." But if the book at times stirs up controversy, it also stimulates thought; it is marked by real ability, earnestness, and insight.

EXAMPLES OF WROUGHT-IRON WORK.

THE folio volume of illustrations of English and Scotch iron work by Mr. Murphy* is one of the finest books of illustration of ancient art-work that we have seen. Its merit consists not only in the fine character of the examples selected and the care with which they are drawn, but also in the complete manner in which their illustration is carried out. Geometrical measured drawings of such work are the only kind that are of value in giving the construction of the work; but they do not give its effect. To supply this side of the illustration, a number of reproductions from photographs from the actual work *in situ* are added; so that the reader sees on one page the effect of the work, and can then turn to the measured drawings to study the manner in which this effect has been arrived at. In addition to this, in several instances block plans of the houses and their surroundings are given, so as to show in what relative positions the grilles or gates illustrated are placed in relation to the house. In this manner the work of illustration is carried out as completely as it is possible to have it.

The work includes eighty plates, but not so many different sites are drawn upon as might be expected, since Drayton House (Northamptonshire) occupies nineteen plates, and Belton House (Lincolnshire) the next eight. But the examples from these two places are among the finest and most varied that could be found; and indeed there is nothing illustrated that is not first-rate of its kind. In looking through the examples from these two houses one is struck by the admirable manner in which the more decorative portion of the designs is distributed. The gates and railings retain for the most part their proper character as fences. The great mass of them consists not of scrolls and twists, which have a weak effect when too much indulged, but of upright parallel bars linked together and supported by horizontal pieces, the appearance being enriched by intermediate bars at the base, and by small pendants introduced at the top; but the practical character of a fence is not lost sight of. The gateway of the south avenue at Drayton House, with the railings at each side, shown to a small scale on Plate II., is an excellent instance of this. The gates are plain grilles over most of their surface, with intermediate spear-head bars about 2 ft. high at the foot; the decorative treatment being confined to a narrow band down the outer edge of each gate (forming a double band when they are closed), and between the heel of the gate and the stone pier is what may be called a broad pier or pilaster of scrolled open work between strong uprights, forming the real piers on which the gate hinges. These again abut against and are fixed into the massive stone piers, which are not such good specimens of masonry design as the gates themselves are of metal design. Outside of the stone piers the railings extend in bays 7 ft. long of nearly plain railing, these bays being divided by a kind of pilaster about 14 in. wide of decorative scroll work with a special finial. Thus the character of a defensive railing is preserved, and the plainness of this gives additional effect to the decorative portions introduced at intervals. This design is quite a lesson in the treatment of a fence of this kind. Above the top bar, both in gates and railing, the artist has allowed himself a free hand in decorative heads, but this is just where free play of line can rightly be allowed; the constructive and utilitarian portion of the work finishes with the top rail; the rest is play, and is treated accordingly. The Belton work is treated in the same

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* English and Scottish wrought-iron work: a series of examples of the best periods, together with most of the examples now existing in Scotland, with descriptive text. By Bailey Scott Murphy, Architect. London: B. T. Batsford. 1904.

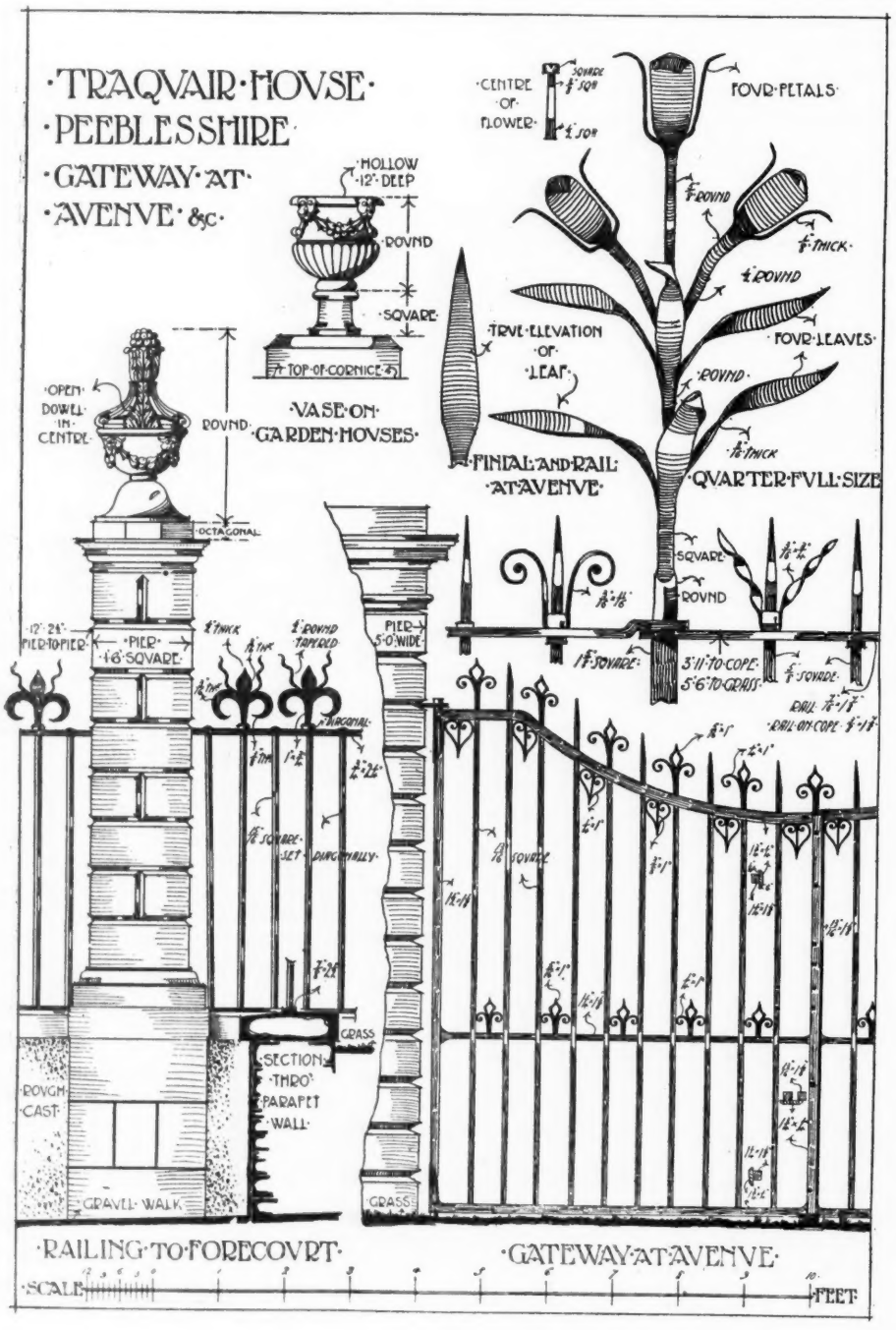
spirit, and one might suppose that the same person imagined and executed them. The effect of the work is charmingly shown in the photograph of the gate to the "Wilderness" on Plate XXI., with a figure standing by to give it scale; this gate, it appears, is not in its original position, but we quite agree with the author that it could not better fit its position than it does here. The photograph of the entrance gateway on the same plate also has a beautiful effect. Here the gates are actually hung to the stone piers (better specimens of masonry design than those at Drayton), and the diversifying panel of scroll work is introduced down the centre of each gate, instead of at the sides as at Drayton, and a charming effect it has; the rest of the gates being nearly plain bar work, which supports a very boldly treated scroll finish above, with a heraldic shield in the centre. Nothing could show better than this gate the value of reticence and judicious placing of decoration in work of this kind.

Trinity College (Cambridge) gates show the same well-considered contrast of decoration with plain work, but the details of the decoration are not so refined. In some examples we see a warning against too great elaboration without attention to leading lines; the head of Trinity College (Oxford) gate (Plate XLVI.) is an instance; the artist seems to have desired to cram in as much rich detail as possible, and it is a very fine piece of work in its way, but it wants decision of line and grouping of parts. The gate in the archway in Clarendon Buildings, Oxford (Plate L.) is an example of enriched treatment throughout, the gate being a series of panels of elaborate scroll work, with a still richer head in the arch—nothing left plain but the containing bars; but this kind of treatment looks more in place in a gate filling a comparatively narrow opening (8 ft. wide) with the support and contrast of the plain stone walling on each side of it; it is a decorated surface opposed to a plain surface.

It appears that there is but little of this class of work left in Scotland; the author believes he has given all that there is of any importance; and of this two houses, Traquair House (Peeblesshire) and Donibristle House (Fifeshire) furnish between them eight out of the fifteen plates. There is a very recognisable difference of manner between the English and the Scottish work; the latter is for the most part less refined and more abrupt in line, and marked occasionally by exceedingly bold treatment of more or less naturalistic foliage; the examples of this at Donibristle House, where the finials give the idea of flower-pots stuck on the top of the balustrade, are pretty well known. It is impossible not to admire, in a way, the boldness, not to say audacity of their treatment, but if it were modern work we should call it bad art; as it is, it is interesting and valuable as a specimen of a peculiar school of ancient work. The naturalism of these details is rendered the more startling by the plain rectilinear treatment of the balustrade to which they form a rather doubtful ornament.

Should natural forms be imitated at all in wrought-iron work? We are inclined to think not; it is out of keeping with a material like iron to imitate in it the forms of what in its original nature is essentially soft and fragile. The association of form and material quarrel. And it is all the more so when bits of naturalistic leafage are introduced in the midst of conventional work; they strike a jarring note. The fault is to be found, no doubt, in many of the best productions both ancient and modern; but a fault it remains.

We give reductions from two of the large detail plates, one of English, the other of Scotch work, to illustrate the difference in their spirit. There is a great deal of character in the Traquair House design, and in this case the quasi-naturalistic finial is sufficiently conventionalised to keep its place as metal-work; it is far superior in this sense to the metal vegetation of Donibristle House. But we think no one can help feeling that the Drayton House detail is the finer type of work, and has more of "style" in it. This also, however, affords an instance of that false intrusion of a bit of naturalism into the midst of conventional work, in the spray of leaves near the top, which is in a totally different character from the broadly treated conventional foliage of the rest of the work; and, moreover, this bit of naturalism has beguiled the artist into introducing the one bad curve in the work; all the rest of the design is in fine flowing tangential curves, this natural spray alone breaks off in a nondescript awkward curve, spoiling the symmetry of what would otherwise have been an entirely noble design. It affords a lesson what to avoid, as the rest of the design affords a lesson in pure style.



NOTES.

Registration Abroad.

THE inquiries set on foot by the Institute of Architects in regard to the extent to which architecture is an open or a closed profession in other countries than our own have resulted in a statement, given without comment in the last issue of the Institute *Journal*, which ought to make the advocates of Registration reconsider their position. It appears that the profession is an open one in the following countries—Germany, Austria, Hungary, Holland, Belgium, Switzerland, Portugal, Sweden and Norway, Greece, Turkey, United States (save in three States), and (last but not least) France.

In Austria there are Government diplomas but they are little sought after. In Hungary an architect aspiring to an official position requires a diploma from the Polytechnic school of Buda-Pesth. In Holland the State Polytechnic School grants a diploma, but it is not obligatory; in Portugal a similar condition prevails. In Greece the School of Art of Athens grants a diploma to those seeking an official position. In France the Government gives diplomas to the nominees of the Ecole des Beaux-Arts, and the title "Architecte diplomé par le Gouvernement," but these diplomas confer no privileges or rights, and no official architect need possess them. The only countries where architects are in the position to which the English Registrationists wish to bring them are Italy, Spain, and Russia. In reference to the social effect of Registration in the last-named enlightened country, we may call attention to the short letter by Mr. Reavell in our correspondence column.

Herculaneum. AFTER a good deal of absurd misrepresentation in the press, Dr. Waldstein has at last, in a letter in Monday's *Times*, fully satisfied every unprejudiced reader that in his proposal to form an International Committee for carrying out the excavation of Herculaneum, he has been acting with the full knowledge and approval of the Italian Government. Everything has been done in proper form, and the Italian Government has given its formal and official consent. It is to be hoped that this great and most interesting archæological enterprise may soon come into practical operation. It is not as if it were a buried Greek city, certainly; still, the imagination cannot but be excited at the thought of the possible discoveries to be made in unearthing the long-buried streets and houses.

Flood Water Storage. IN a letter to the *Times*, Professor Henry Robinson urges the desirability of utilising the excess rainfall of wet seasons to meet the deficiency of dry years. For some years Professor Robinson has consistently advocated the construction of impounding reservoirs for the benefit of the community in times of drought, and incidentally for reducing the amount of injury caused by floods; a course which has also been advocated over and over again in our own columns. In a sense, no doubt, every waterworks reservoir is engaged in performing this duty in a small way, but the principle requires extension on a very large scale, and particularly in connexion with rivers and streams all over the country, if any real good is to be accomplished. Taking the case of the Thames alone, we have an immense opportunity for useful work. In rainy seasons the channel above Teddington cannot possibly carry off the flood waters, and in dry seasons the bed would be almost dry if it were not for locks and weirs. An intelligently-designed system of reservoirs would be an incalculable boon to the population of the Thames Valley. However, in the absence of a single authority endowed with ample powers and very adequate funds, it is hopeless to expect anything of the kind. Local government may be all very well in its way, but county and district councils are generally averse to co-operative measures for the common good.

The Traffic Problem. ONE of the greatest difficulties encountered by all who attempt to deal with the traffic problem in great cities results from the continually increasing desire of the inhabitants to make use of facilities for locomotion. The congestion due to growth of population is of far less moment, although sufficiently perplexing to traffic reformers. In the course of his paper, read at the Society of Arts, the Hon. Robert P. Porter remarked that within twenty-five years the number of journeys had increased in New York from forty-seven to more than 400 per head of population. Indeed, as Sir William White said on a recent occasion, nobody in New York seems to walk a few hundred yards if he can ride. We appear to be arriving at the same condition in London, for the number of journeys per head has increased almost as much as in New York during the last generation. Even assuming no further increase of what Mr. Porter termed the "travelling habit," the growth of population every ten years will provide 200 million fresh passengers to be dealt with, representing one-third of the total number carried by all the metropolitan railways now in operation. Thus it becomes tolerably clear that new means of transport must be filled up as quickly as they can be provided, and that ceaseless activity on the part of promoters and constructors is an absolute essential, unless things are to go from bad to worse.

The Cudworth Railway Accident. WE quite agree with the verdict of the jury in the inquest on the victims of the railway accident near Cudworth, that there was not "sufficient evidence to convict any one criminally"; but one thing the evidence does go to show most decisively, viz., that the machinery for protecting trains in a fog is ridiculously primitive and inadequate. The principal element in causing the accident was the coming on of a sudden and unexpected fog, yet the signalman at the Cudworth cabin stated that "usually it took an hour to get the fog signalmen on." When asked if he could not have run down and put a detonating signal on the line, he made the reasonable reply that he was too much occupied at the moment with receiving and answering signals to be able to leave his cabin. But to think that the lives of passengers, in a sudden fog, depend upon collecting together men who cannot be on the spot under an hour! Railway companies ought to be ashamed of having no better resource at this time of day. It surely should be possible to devise a fog signal which can be actuated from the signal cabin.

Automatic Railway Couplings. ALTHOUGH the employment of automatic couplings was recommended more than thirty years ago by sundry Board of Trade inspectors, none of the railways in the United Kingdom use them, except a few companies by whom they have been applied to passenger carriages. One circumstance which may account for the general indifference exhibited by British railway companies to automatic couplings is the comparatively small number of accidents in this country during shunting operations. In the United States, where the old "pin and link" coupling was generally retained until the Act was passed rendering the use of automatic couplings compulsory, the number of casualties amounted to 11,710 in 1893, as against 297 in the United Kingdom. Since that year the number dropped to 2,273 in 1900, but rose to 3,719 in 1904, chiefly owing to defective equipment. Thus the necessity for reform in our own country is not so pressing as it was in America. Still even a few lives are worth saving every year, and the reward of the companies will come in the greater capacity for work of the goods yards and the dispatch of trains with less expenditure of time. The one essential is to find a type of coupling likely to meet the approbation of all the companies, and this can only be done by the institution of trials such as those recommended by the Royal Commission of 1900.

Landlord and Tenant. A CURIOUS legal point in relation to flats seems to be raised by the case of Hargroves, Arowson, & Company *v.* Hartopp and another. The premises were let in separate floors, and the plaintiffs' were lessees of the third floor. The roof was not vested in any person, but as the judge of the City of London Court had found, it belonged to, and was under the control of, the lessors, the defendants. The plaintiffs' premises became flooded with water owing to the gutters in the roof having been allowed to get choked. There was no neglect in repairing the roof, the sole cause of the damage being this temporary obstruction in the gutters. The Divisional Court affirmed the judgment of the Court below, holding defendants liable for the damage for neglect in clearing the gutters in the first instance, and in also failing to do so promptly after notice, since they had retained possession of the roof; but the decision does not seem to have been clear of doubt, and the Divisional Court, consisting of three judges, gave further leave to appeal.

Writing and Illumination. Two short papers, on "Calligraphy," by Mr. E. Johnston, and on "Illumination," by Mr. Graily Hewitt, were read at the Society of Arts on Tuesday evening; part of the scheme of lectures organised by the Applied Art Committee. The former is a somewhat new subject to be treated from the point of view of an art, though it is well worth regarding in that light; and it seems that attention was drawn to the subject at South Kensington by a consideration of the bad writing in which drawings delivered in the art school were entitled and described by students. Mr. Johnston's series of examples shown on the screen, from Roman writing down to the Renaissance period, were very interesting, and attention was drawn to the relation which the form and character of the letters had to the instrument which made them; many of the characteristic forms of

letters, and the position of broad and narrow strokes, arising naturally, as was shown, from the action of the pen when used upright or slanting. The scripts shown were those used in deliberate book-writing, not in ordinary correspondence or memoranda; as the lecturer observed, most of us in the present day have two hands, that which we use in an important letter carefully written, and that which we use when time is an object. An interesting lecture might be given, however, on the picturesque element in ordinary everyday handwriting, with some examples of the splendid handwriting, in their ordinary correspondence, of some of the great Renaissance artists; a writing worthy of a great age of art. The finest that we remember to have seen is that of the architect, Alberti. The hurry of modern life, no doubt, is against beauty in handwriting — not to speak of the intrusion of type-writing, which, except in purely business communications, we dislike, as destroying the personal character in a letter; still, we came across a fine modern hand now and then, picturesque without effort or consciousness. Two of the finest hands we have seen were those of two late eminent musicians (S. S. Wesley and W. T. Best); and we could name a London architect, still fortunately among us, whose handwriting is worthy of a Renaissance artist. Position and occupation in life do not seem to have much to do with it, however; of the two very worst and most exasperating handwritings we have ever known, one was that of Dean Stanley, the other is that of an occasional contributor of some short but useful trade paragraphs to this journal, which the printers somehow seem able to read, but the editor certainly cannot! The other paper of the evening, on Illumination, suffered under the disadvantage that the lantern illustrations could not give colour, but was disappointing in other respects; the examples given, though described by the lecturer as "very jolly" (a colloquialism of the atelier which seems out of place in a public lecture), were not of the best in point of design; even the elaborate modern example given at the close, as a sample of what illumination could do, impressed us, in spite of beauty of detail, as being undecorative both in its general lines and in its relation or (non-relation) to the text. But the subject itself is far too large a one, in any case, to be treated in a short paper.

Pictures by Mr. Oliver Hall.

WE confess that we would rather meet Mr. Oliver Hall as an aquafortist than an oil-painter. His collection of small pictures at the Dowdeswell Gallery is certainly anything but commonplace; he has a style, and a thoughtful way of regarding nature; but his pictures are depressing from a certain want of light and air about them, and an apparent aversion to showing any detail sharply and clearly, even in the foreground. They are not of course intended to be like nature; they are nature translated into moods; but the moods are sombre. "Portsmouth Old Town" (5) is perhaps the best of the collection, and is a good example of the manner in which a picture may be made out of a scene of this kind, in which nothing realistic is attempted, but in which everything falls into its place as part of a conception in composition and colour. A picture of an analogous subject, "An Old Seaport Town" (27), though not equal to the one just named, has the same kind of interest, and also shows an apparently intentional adoption of something of the manner and colour of an older period, as if in harmony with the subject. Mr. Hall has a very broad style of handling, as shown for instance in the painting of the masses of reeds by the water in the largest picture, "Beaulieu Marsh" (10); there is no indication of detail, yet the effect is conveyed. This is, no doubt, an intellectual handling of paint, only one asks whether it is not possible to be too intellectual; we sigh for a little of what Constable called "God's daylight."

Competition Ghosts.

A WELL-KNOWN London architect sends us a letter which he has received, the nature of which is apparent in the following extract:—

"I note that there is a competition open for the above and would like to know if I may prepare designs for same upon speculative terms, should you anticipate entering.

For several years past I have made a special study of this class of building, and have found great mutual advantages arising from a combination of local experience and that of experts who devote all their time to such work, my designs having been placed first and second under assessors' awards in a large number of recent open competitions.

Devoting all my time to such work, I am enabled to accept very moderate fees, depending almost entirely upon success."

We do not suppose there can be many people doing this kind of thing, or we should hear of it oftener; and as to the statement that his designs (under another person's name) have been often placed first by assessors, that is probably a mere piece of brag intended to bait the hook. A man who would address that kind of letter to an architect in good position would say anything. Whether he has really found any architects to accept his assistance one cannot tell, but if so, one knows pretty well what sort of architects they must have been. He has written to the wrong man this time, at all events; and perhaps this may be a warning to him not to insult architects of standing and reputation by sending them such proposals.

KING'S COLLEGE ARCHITECTURAL SOCIETY.—Arrangements have been made for a series of papers to be read before this Society, to which all fellow-students or architects outside the college will also be welcomed. The first lecture, on Thursday the 9th inst. (5.30 p.m.), will be by Mr. Houghton, on "Christchurch Priory."

EDINBURGH AND LEITH BUILDING TRADES.—The thirty-third annual general meeting of the Edinburgh and Leith Districts Building Employers and Allied Trades Association was held on the 24th ult. in the Building Trades Exchange, 26, George-street. The Chairman, Councillor Macleod, presided, and in moving the adoption of the annual report commented on the dull state of trade during the past year and the very large number of men unemployed. The report was adopted, and the following office-bearers were elected for the ensuing year:—Chairman, Mr. James Forrest; vice-chairmen, Mr. Patrick Knox, Parish Councillor Wilson, and Mr. W. Thomson; secretary and treasurer, Mr. James Cameron, solicitor. The following gentlemen were added to the Executive:—Mr. Robert Lamb, Mr. Andrew Davie, Councillor Macleod, Mr. A. Cruikshank, Mr. Taylor, Mr. J. R. Watson, Mr. James A. Craw, Mr. Macdonald, and Mr. John Lownie. Delegates and representatives were also appointed to the Scottish Building Trades Confederation.

LETTER FROM PARIS.

THE fall of the ministry presided over by M. Combes has had, as an unexpected consequence, the creation of a Sous-Secrétariat des Beaux-Arts, of which the titular Secretary, M. Dujardin-Beaumetz, is, for a wonder, an artist of undoubted competence for such a post. He is a painter, member of the Société des Artistes Français, who has received a medal at the Salon for his pictures of patriotic subjects. His late wife was also a painter of talent, who from 1880 to 1888 exhibited, under her maiden name Mdlle. Marie Petiet, various *genre* pictures which attracted a good deal of attention. This creation of a new post will probably lead to the retirement of the actual Directeur des Beaux-Arts, M. Marcel, who, in the course of a brief period of office, has given proof of competent artistic knowledge. He may perhaps be accused of having shown too great a partiality for the Impressionist school, and of having been largely concerned in setting on foot the unfortunate "Salon d'Automne"; but these errors were compensated for by a real administrative capacity. At all events, the choice of M. Dujardin-Beaumetz for the new office is a fortunate one.

The fine estate of Bagatelle has at last been definitely purchased by the municipality of Paris, for 500,000 francs. It remains to be seen what they will do with the château, built by order of the Comte d'Artois, brother of Louis XVI., on the façade of which he had engraved the motto, "Parva sed Apta." There is talk of turning it into a sanatorium for the children of the primary schools, a proposal which will not be very welcome to the fashionable society which frequents that part of the Bois de Boulogne. It would be much better to make it a museum of XVIIIth century pictures and furniture, which would undoubtedly be very successful in so charming a home. As to the large park, of about 55 acres, that has already been opened to the public, as an annexe to the Bois de Boulogne.

The bridge at Passy, on which the south circular line of the Metropolitan railway is to cross the Seine, is expected to be finished this spring. The bridge, which is the most considerable engineering work on this line, will cross both arms of the river. The larger portion of it will have a centre arch 54 mètres wide, and two other arches of 30 mètres each. The other section will have a centre arch of 42 mètres and side arches at the banks of 24 mètres each. The two bridges carry, on cast-iron columns, an upper bridge 7 mètres wide which will take the two lines of the Metropolitan. The cost of the bridge is estimated at 3,800,000 francs, and the accessory works at about four millions, making a total of 7,800,000 francs.

For the line No. 7 of the Metropolitan the terminal station is to be formed on the Place du Carrousel, near the Gambetta monument, with a subterranean corridor leading to the Palais Royal station. Ultimately it is expected that the gates from the Tuileries on to the Rue de Rivoli will be enlarged.

The managing Committee of the Fondation Rothschild, which has for its object the improvement of the material condition of the artisan class, has opened a competition, to be carried out in two stages, for the erection on one of the sites which it has acquired from the municipality of a group of model dwellings, containing small habitations which are to be sanitary and economic. The public exhibition of the designs in the first competition will be held from the 3rd to the 8th of April, and that of the second competition designs from the 3rd to the 8th of July. M. Nénot has been appointed the principal adviser for this competition.

A monument is shortly to be erected at Neuilly-sur-Seine to the memory of soldiers born within that district who have died in fighting for their country. M. Raoul Verlet has been commissioned to carry out the work. His design shows a figure of a woman with helmet and cuirass, who symbolises "La Patrie en Deuil," supporting a dying soldier who leans against the muzzle of a gun. As a whole, it is a fine and decorative work.

M. Loviot has been appointed architect to the Musée Guimet, as successor to M. Gagné. The latter has been appointed architect to the Odéon, the late architect of which, M. Paul Frédéric Buval, died recently at the age of eighty-eight, after a life full of honourable achievement. His son, Paul Buval, also an architect, and member of the Société Centrale, died some years ago.

THE ARCHITECTURAL ASSOCIATION.

An ordinary fortnightly meeting of the Architectural Association was held on Friday last week at the new premises in Tufton-street, Westminster, Mr. E. Guy Dawber, President, in the chair.

The minutes having been read by Mr. H. Tanner, jun., Hon. Secretary, and confirmed, and some nominations having been read,

The following gentlemen were elected as members, *i.e.*, Messrs. J. K. Ground (Maidstone), S. A. Whitehead (Sidcup), R. M. Kelly (East Sheen), H. D. Ward (Grays), and H. E. Bunce (Upper Clapton).

The President announced that the following members had re-joined, *i.e.*, Messrs. Christopher M. Shiner, Ellis Marsland, Cyril E. Power, and C. S. Yates.

The Building Fund.

He also announced the following further donations to the Building Fund :—

	£	s.		£	s.
Charles Morrison..	100	0	J. H. Pye	5	5
Walter Cave ..	10	10	Gill Brothers ..	2	2
A Potter	10	0	J. Parnell & Son ..	2	2
W. Bagaley & Sons	5	5	Alfred East, A.R.A.	1	1
R. Crittall & Co. ..	5	5	Higlett&Hammond	1	1
Hayward&Wooster	5	5	F. J. Lloyd	1	1
James Lemon ..	5	5	J. R. Moore-Smith	1	1

The President said he had much pleasure in announcing these amounts and in stating that the total received since the last meeting was thus 139*l.* 8s.

The late Mr. Blashill.

The President said he regretted to state that since the last meeting the Association had lost by death one of its oldest members. He need not say much about the late Mr. Blashill, for all of them must have known him either personally or by name. He joined the Association in 1857, and some years afterwards he became President. Many years ago Mr. Blashill organised a very successful trip to Italy. He (the President) would but be voicing the feelings of all of them in proposing that a vote of condolence be forwarded to the widow and relatives of the deceased.

The vote was agreed to in silence.

Mr. Louis Ambler, Hon. Secretary, announced the following donations to the library :—Parcel of French architectural journals, presented by Professor Aitchison, R.A.; "Old Cottages of the Cotswold District," by E. Guy Dawber and W. G. Davie, presented by B. T. Batsford; "Principles of Planning," by P. L. Marks, presented by B. T. Batsford; "History of Architecture," by B. F. Fletcher, presented by B. T. Batsford; "Academy Architecture," 1904 (2), presented by Mr. Alex. Koch. A vote of thanks was accorded to the donors, and also to Mr. Andrew Oliver for presenting a number of negatives of French cathedrals, and to Mr. J. D. Crace for presenting a print of the old bridge at Exeter.

Byzantine Architecture.

The following papers on Byzantine architecture were then read :—

The first paper was by Mr. J. B. Fulton, who said :

One of the first-fruits of Christianity was architecture, spreading over Southern Europe, Palestine, and Asia Minor. It would, indeed, be an interesting study to trace the influence of early Roman building down to the Byzantine period. The influence is evident, as the architects must have visited Rome, and there studied the great temples and baths; but the Romans, with all their power of knowledge in construction, and imagination in design, could never have built S. Sophia.

Now, I wonder if we have realised that the nations down through the ages have built their greatest works to their God; here, in this new religion, we have everything carried to a greater height of excellence. Byzantine architecture was a revelation to the world, because it was not only building in the knowledge of beauty and truth, it was also the beginning of a higher and nobler power—soul-passion moulded in building. I could have written an elaborate treatise on the history of this style, but history is not particularly helpful in design, and anything which I say to-night must be for the furtherance of this great study.

In sketching a building one ought, I think, to try and see design first, material, etc., afterwards; so in our thoughts and studies let us ever seek after food for our creative faculty in architectural design. I desire to show you some examples of Byzantine architecture—examples well-known, but not one-half appreciated, as we do not fully realise the beauty and truth of construction in this style.

CONSTANTINOPLE : *S.S. Sergius and Bacchus.*

Originally there were two churches; the existing one is a gem, and is in a wonderful state of preservation. The exterior shows domes resting on a great square base which, although bold in conception, is not very beautiful, but here little or nothing of the original detail is left. The dome is supported by eight piers, the arches forming an octagon, but below the arches the angle sides of octagon are semi-circular recessed (and it is these recesses which give to the interior such a charm). The entablature of the first order shows a breaking away from classical tradition, although retaining architrave, frieze, and cornice.

This entablature gives strong horizontal lines, which are required because of the semi-circular recesses, etc. The whole proportion of the lower story is perfect, and impresses one very much. The delicate detail of capitals is worthy of special note, although they are now half-buried in whitewash; note also the bold and ingenuous way in which a combination of capital and entablature takes the round to the square on the upper columns.

There are numerous churches of a later period in Constantinople, such as :—

S. Theodore, Tyrone.

The outer narthex is comparatively large, and, although the façade in itself is good, I think it unworthy of the best traditions of this style, as it is false to the plan. The church in plan is a Greek cross. The columns supporting the dome seem rather weak.

S. Theodosia. (Now Gul-Jami.)

The plan is an interesting one. The whole effect of the interior is achieved by form, as there is no detail.

Church of the Monastery of the Chora. (Now Kahriyeh Jami.)

The façade of this church is thought to have served as a model for St. Mark's, Venice. The glory of this church is the decoration. There we see what the Byzantine architects were aiming after—true architecture, which means the unity of the three arts; revealing the character of the building. Constantinople is well worth a visit to see these Mosaics alone, even although they have suffered by fire and earthquakes. I had the privilege of drawing the figure of St. George in the outer narthex, which is undoubtedly the finest study in Mosaic that I have ever seen. With the exception of the head, hands, and feet it is very excellent, showing in its every line the true spirit of decorative design.

I wish you to return to SS. Sergius and Bacchus, and from there we will go direct to S. Sophia. We see in SS. Sergius and Bacchus the germ; in S. Sophia the idea fully developed. This is one of the most talked-of buildings in the world, and, if it is not, it ought to be one of the most admired. You must all be familiar with the general conception of S. Sophia's great dome, half domes, semi-circular recesses, narthexes, aisles, and great buttresses. The exterior is said to possess little architectural beauty. I think this impression is arrived at because of the stucco with which the original material is covered. I would suggest the taking away of the stucco, the minerets, buttresses, and innumerable small Turkish buildings, which are out of harmony with the main building. Now look at the design with all these removed; see the great buttresses, the arch between, the semi-domes and great dome rising from the square base. Is it not a magnificent pile? The glory of the building is the interior; here the three arts meet in perfect harmony (as they also met 500 years before in the capitals of the north portico of the Erechtheium, in Athens). The passion and mystery is marvellous. No other building can compare with it in beauty, fine proportion, and delicate detail. I have often wondered why a building such as this can only be built at a particular place and at a particular time or period in the world's history. I have sought to penetrate the secret thoughts of the architects (Anthemios and Isodores) who built this church. Besides having a knowledge of construction and design, their lives must have been virtuous and wholly concentrated to their profession or art—to the glory of their God.

As Ruskin and others have said somewhere, no matter what we do, even draw one line and that line reveals our character. What a beautiful moral tone must have been reached before this church could have been built, as down to the minutest detail great excellence and refinement is shown. Let us think of this subject seriously, as we must possess this power before our national style can become worthy of the nation.

PALESTINE.

St. Mary's Church in Bethlehem is one of the earliest Byzantine churches known; in plan it consists of a nave and double aisle. The Golden Gate, Jerusalem, is in this style, but I came across nothing to call for special attention.

ASIA MINOR.

In Brusa we came across some interesting details such as panels, capitals, etc., but nothing of special note.

GREECE.

Athens has quite a number of Byzantine churches; all are comparatively small, although interesting. Byzantine churches are scattered all over Greece. I will mention but two, the Convent of Daphni, situated about five miles from Athens on the Sacred Way; in plan a Greek cross, and, although the construction is not quite so excellent as in the earlier Constantinople churches, it is nevertheless straightforward and good. The Mosaics on a gold ground are in fine preservation—at least, what are left. The figure of Christ is specially beautiful.

I also made a pilgrimage to St. Luke's, Stiris. This perhaps is one of the most interesting that an architect can make in the quest of Byzantine churches. To visit the monastery and taste the hospitality of the monks is an experience in itself well worth having. Combine the love of fellow-men with the beauties of a vast and absolute quietness in the midst of great ranges of mountains, and you will have an idea of at least two of the attractions to this monastery in north Greece. The glory of the monastery is the Church of St. Luke. The adjoining Church to the Mother of God is not quite so interesting. The Church of St. Luke's is almost perfect in its general design and decoration. Parts have fallen into disrepair, but, as a whole, it is still in a wonderful state of preservation. Messrs. Schultz & Barnsley deserve praise for bringing this gem of Byzantine art to England in book form. From my notes taken on the spot I find that what impressed me more than all else was the beauty of construction and lighting, which gave so great a mystery to the interior.

ITALY.

In Italy Byzantine art reached a high state of perfection. The centres are Rome, Ravenna, and Venice. The Church of San Vitale at Ravenna shows direct influence from Constantinople. In plan a semi-circular recess is formed from each side of an octagon except the side forming the chancel. The glory of Byzantine art in Italy is the Church of St. Mark's, Venice. In plan a Greek cross. A glance at the plan will reveal piers, etc., carrying domes forming aisles, etc. The conception of the interior is a glorious one, although to me it cannot compare with S. Sophia; it lacks the vastness and dignity, although in wealth of colour it has no equal. The lighting is well-nigh perfect, giving true value to form and colour. Ruskin thus describes it by using such expressions : "The effects of St. Mark's depend not only upon the most delicate sculpture in every part, but as we have just stated, eminently on its colour also; and that the most subtle, variable, inexpressible colour in the world, the colour of glass, of transparent alabaster, of polished marble, of lustrous gold." These expressions give but an idea of beautiful material and fine workmanship; besides all these, there is a beauty which forms a mystery which lighting and atmosphere can only give. The façade is the finest example of an exterior in this art. The Gothic addition in the XVth century might have been better; and as regards fine architecture, is not to be compared with the Byzantine building, with its pillared recesses, delicate sculptured detail, and rich material; but, above all, the magnificent conception.

DOMESTIC.

I have seen and know but little of Byzantine domestic architecture. The Palace of Belisarius, Constantinople, is a magnificent example; and we had the pleasure of measuring it. This is what I would term a study, a decorative study, in stone and brick. There is a remarkable richness and wealth of material, and ye it is but the two commonest building materials we have. The decorative flat quality aimed after is very refined and suggestive. Some of the spandrils are specially good.

Byzantine art we must study if we truly desire our national thoughts to develop into a recognised style. See in this style true construction and excellent blending of the three arts.

D

Byzantine Plan-Forms.

Mr. E. F. Reynolds' paper was as follows:—

The development of early Byzantine building is a subject of much interest and also of much difficulty. It is of interest because it formed an unbroken sequence in a period of disruption and change, linking the classical age of Greece and Rome with the mediæval age of Christianised Europe; and also because it was so pregnant a source of future development. It is of difficulty because the influences which shaped its course were so complex, and because its builded record is now so broken and incomplete.

The founding of Constantinople is sometimes regarded as the starting-point of Byzantine art, but such arbitrary divisions are always misleading, if not altogether untrue. The removal of the capital from Rome to Constantinople doubtlessly exercised a very deep indirect influence, and the energy of building which it called forth must have quickened architectural development, but it was strictly a development and no sudden change of style. It is historically certain that the new capital was intended by its founder to be a direct continuation of the traditions of the old capital. In the Edict of Dedication its title was "the New Rome"; the general design of the city followed the Roman model, with its forum, its circus, its basilicas, baths, and porticos; and its population was drawn from other cities of the Empire, and especially from Rome itself. And it is evident that this was inevitable, for Rome had so long and so completely impressed its type of civilisation throughout the Empire that no other form would have then seemed possible. Even after its removal of almost a thousand miles eastwards the capital was still surrounded by Roman traditions.

Thus, both by intention and circumstance, Constantinople was essentially Roman in its foundation. But there were also many influences which in their working could not fail to modify this tradition and prevent a mere reproduction of Roman art. The most formative of these may perhaps be summed up as (1) the renewed ascendency of the native Greek genius, (2) the more direct communication with Oriental influence, and (3) the unrestrained play of the forces of the Christian religion.

1. The removal of the capital placed it at the source of that Greek intellectual energy which had originally brought the Romans under artistic subjection. They had largely borrowed their decorative art from the Greeks; but an inverse process was now to take place, for while the Byzantines developed that system of constructive design which had formed the real vitality of Roman work, they modified and eventually discarded the unrelated decorative design which had obscured the structural conception. Under the Romans a burden of over-developed and conventionally-applied detail had been accumulated, serving to bestow a pompous magnificence on their buildings, but only remotely expressing their realities; and it was reserved for the lively Greek sense of right-expression to translate the simple grandeur of Roman building into its decorative equivalent. Under Greek discrimination its vital principles were disengaged and purified, and decoration was once more brought into intimate relation with structural facts.

2. By the removal of the capital contact was also established with a more direct Oriental influence, for the position of Constantinople has always rendered it the centre of commercial exchange between East and West. The East has ever been the natural home of the vault and the dome, and it is there that the origin of these methods of covering must be sought. At a later time, in the great dispersal of Mohammedan conquest from its Oriental centre, the dome was always carried as a characteristic of building; and even now, in Persia and elsewhere, the dome is the common unit of roofing. To this eastern influence, which flowed to Constantinople along the great trade-routes, may be attributed that freedom in the use of vault and dome which formed so integral a part of Byzantine building. As a significant instance, the Byzantine method of vault construction was similar to the Oriental method, the courses being laid with inclined beds and independent of centring, while the Roman construction of ribs and shell was essentially different.

This influence also filtered through Asia Minor, where a local school had already established itself, experimenting with new combinations of plan-form and arriving at the principle of the pendentive. Even the Imperial Roman buildings at Baalbec and Palmyra show something of the same tendency to break away from the academic style, in the substitution of the arch for the lintel, and in freshness of decoration. It seems as though this meeting-place of Greek and Oriental formed a kind of forcing-bed which fostered the early growth of many forms which afterwards became typically Byzantine.

3. Christianity was recognised as the State religion only a short time before the foundation of the new capital, and it was at Constantinople that it found full force of expression. It brought a new inspiration to building, needing fresh forms specially adapted to its ritual, and a new mode of decoration explanatory and symbolical of its creed. The perfunctory worship and comparatively insignificant temples of the Roman mythology gave place to an ardent and enthusiastic religion which penetrated and revitalised all the arts. Roman art had in reality been almost purely secular, and its most characteristic monuments had been the Fora, the theatres, the baths, and, above all, the great works of engineering. But from the rise of Christianity religious building again assumed the lead, and although this is now unduly emphasised by the better preservation of such works, yet there can be no doubt that the prime energy of the Byzantines was devoted to their churches.

These, then, were some of the main factors which determined the difference between Roman and Byzantine work. Following the new foundation, there was a period of 200 years' growth and formation, a time of experiment with the new forces, and a gradual assimilation of the various elements—yet a period fruitful of splendid works, and culminating with the erection of S. Sophia. The precise course of development during this period can be only imperfectly known owing to the destruction of so many intermediate buildings. Constantinople has especially suffered from the violence of its earthquakes and the still greater violence of its riots, but phases which are missing there may sometimes be found in such affiliated centres as Ravenna and Salonica, while a comparison of the developed Byzantine forms with the embryo ideas of late Roman work often suggests the source from which that development sprang.

I propose, with your permission, to give some slight study to the plan-forms of S. Sophia, and to trace some of the earlier forms from which they seem to have been derived. If, in doing so, I traverse familiar ground, it will only be in order to give some sequence to the progression, and if I seem to have drawn to a large extent on recognised authorities, it is perhaps unavoidable in dealing with such a subject.

The uniqueness and originality of S. Sophia lies in the combination of two types of planning which hitherto had been developed more or less separately. These may be distinguished by the terms "basilican" and "radial," the basilican type being founded on a repetition of bays in length, the radial type being founded on a repetition of bays around a common centre, producing circular or polygonal figures. The essential parts of the scheme of S. Sophia are (1) a central square bay, defined by four arches set on piers, and covered with a dome on pendentives; and (2) two complex apses, applied to opposite sides of the central square and regulated by its arches. Of these two principal parts, the first may be traced to a basilican origin, and the second may be derived from the radial type of plan.

Basilican.

Turning attention first to the basilican type. The Romans had already solved the problem of the vaulted basilica, and the application of the intersecting barrel-vault to the great halls or Tepidaria of their Thermæ furnishes a series of such instances on a grand scale. The weight of the vaulting was gathered onto piers which divided the length of the hall into bays, and buttresses were projected behind them to absorb the thrust of the vault. The depth of these buttresses was included within the building by an outer wall, and the chambers thus formed between them were opened to the main hall by archways, while they communicated with each other by openings through the bases of the buttresses. Lighting was obtained by a clerestory which was allowed by the difference in height between the main hall and the subordinate chambers. Such was the usual construction of the Tepidarium, and the well-known basilica which was commenced by Maxentius and completed by Constantine closely followed its model. Here, in all essentials, were the principles of so-called "Gothic" construction—the grouping of the vaults onto recurrent points of support, the articulation of the walls into buttress-piers and enclosure, the consequent formation of aisles, and the method of clerestory lighting.

Church-building of the basilican type largely followed the earlier and simpler construction of continuous colonnaded walls and timber roofs, such as is shown in S. Sabina at Rome, in S. Apollinare Nuovo at Ravenna, in S. Demetrius at Salonica, and in the Euphrasian basilica at Parenzo. But, concurrently with these, the Byzantines also developed the application of the dome to the square compartment, and then extended it in continuous series to the basilican plan.

The Romans had always applied the dome to circular or octagonal ground-plans, and only in the latter case was any transition of plan-form necessary. In the baths of Caracalla there is an instance of an octagonal hall covered with a circular dome, and the transition is made by means of corbelling in the form of a slight pendentive; but the full development of the pendentive was essentially Byzantine, and the principle seems to have originated in the East rather than the West.

The spherical vault is intimately related to the dome set on pendentives, for the construction of its lower portion is, in fact, that of a pendentive, and the construction of its upper portion that of a dome, although there is no break in the continuity of surfaces. Such a form of vault is used in the Tomb of Galla Placidia at Ravenna, where it covers the intersecting square of a Greek-cross plan, the arms of the cross being covered by barrel-vaults. The spherical vault, however, afforded no opportunity of admitting light, and in buildings of a larger scale this led to the raising of the upper part of the vault so as to form a separate dome, and eventually to the raising of the dome itself on a drum.

Plans in the form of a Greek cross naturally result from the use of a central square bay set on arches, the arms of the cross representing the depth of abutment necessary to those arches; and the generalised form of plan was of very early origin, and of almost universal use. The Romans were familiar with it, and it is supposed that its Persian tradition was imported in the cruciform mosques of Cairo. This type of the Greek cross formed a most important chapter in the history of Byzantine planning; for, with the application of the dome to the central square, the constructional meaning of the plan was extended to the vaulting, the barrel-vaults over the arms providing abutment to the thrust of the dome.

The plan of S. Sophia at Salonica shows a development of this type. The central cruciform is abutted by four compound piers, which fill its external angles and bring it to a square outline. The dome is raised on a low drum and set on pendentives, and the shallow arms of the cross are covered with barrel-vaults. This inner part of the structure is complete and self-sustaining, but three apses are added to the east, a narthex to the west, and aisles to the north and south. These aisles are opened to the central area by arcades, and they are of two heights, the upper story being the women's gallery.

The application of the dome to the square compartment being solved, the basilican plan could be covered by a series of such bays. The Church of the Holy Apostles at Constantinople (now destroyed) showed this development. The plan consisted of five compartments arranged in the form of a cross, and each of these was practically a repetition of the central construction of S. Sophia at Salonica. There were the same compound piers, the same shallow arms covered with barrel-vaults; and above them rose the domes set on pendentives, the central dome being pierced with windows. But here the repetition of the bays shows the development of their shallow arms into continuous aisles, and the division is emphasised by the colonnades carrying the women's galleries. Thus these aisles arose from the construction of the square domed compartment, their width representing the depth of abutment necessary for its arches, and their barrel-vaults giving abutment to its dome. The plan is particularly interesting, not only because the Greek cross form of each bay is repeated in the

general disposition, but also because it was the prototype of S. Mark's at Venice.

This Church of the Holy Apostles is known to us only by description, but, if it seems too hypothetical an instance, the existing Church of S. Irene at Constantinople may be quoted. It was a contemporary building, and its plan consists of two great bays covered with domes, the eastern dome being raised on a drum pierced with windows. On each side are narrow abutment-aisles, and colonnades carry the galleries over. The building has been complicated by various restorations and rebuildings, but in its main lines the design is attributed to the same period as S. Sophia at Constantinople.

The Byzantine builders had thus arrived at the domed basilica, and the central square of S. Sophia may be regarded as being founded on the bay-design of such a basilica applied on a grand scale. The plan-form is still remarkably similar to that of its Roman prototype, as shown in the vaulted basilica of Constantine. The main transverse arches are still abutted by deeply-projecting buttresses, the aisles are still formed by the enclosure of their projection, and communicate in the same way by openings through the bases of the buttresses, while the same method of clerestory lighting is preserved. But the substitution of the dome for the vault gave rise to the necessity of its continuous abutment between the main piers, and this is expressed on the plan by the increased depth of the arches which sustain the dome. This depth appears on the ground-plan as a narrow aisle on each side of the main square, and these correspond to the abutment aisles of the smaller basilican churches already discussed. Outside these are the aisles proper, formed by the penetration of the great buttresses, and beyond these again are narrow abutment aisles which absorb the thrust of the vaulting over the aisles proper. Thus the aisle system of S. Sophia shows the complete basilican design in itself, the piers being represented by detached columns.

Turning now to the apses which form the second essential part of the scheme. The apse was a favourite feature with the Romans, and had been applied by them in a great variety of ways. It seems generally to have been regarded as a method of terminating a vista or a series of repeated bays, its curving line satisfactorily returning their horizontal lines. In this way, it was introduced in the basilican plan as the termination of the colonnades forming the nave, and this treatment was repeated at both ends in the Basilica Ulpia at Rome. This opposition of hemispherical forms may be seen on a large scale in the designs of the Roman Fora, and in the enclosures around the baths the same *motif* was often employed. In the baths themselves the apse was used with the greatest freedom, and in some instances it was applied to opposite sides of square vaulted chambers, thus almost approaching the plan of S. Sophia in a very simplified form.

The origin of the apse in the Christian church was probably derived from the "triclina" of the private houses which were the earliest meeting-places of the new sect; but the form and position of the church-apse exactly corresponds with its use in the judicial basilicas, and the ceremonial significance of the latter may well have influenced its use in churches. The repetition of apses at each end of the nave was probably another instance of such parallel influence, for while Roman traditions were quite sufficient to give its origin, yet it often seems to have arisen from a change in orientation, first toward the west and subsequently to the east. However this may have been, it is clear that the opposed apses of S. Sophia were no new invention, and their originality lay rather in the special form which they assumed. For they were of no such simple form as was employed by the Romans, but were of a highly-developed and complex character which was due to an entirely different source. This source was the Byzantine development of that Roman type of plan which I have mentioned as the "radial" type, and it will be necessary to briefly indicate the phases through which it passed.

Radial.

The Pantheon of Rome may be taken as a convenient starting-point. The structure consists of a great spherical dome set on a circular drum, and the arrangements for supporting the weight of the dome and abutting its thrust contained the germs of many principles which were afterwards developed by the Byzantines. The wall of the drum is of great thickness, in order to oppose its depth against the spreading of the dome; but the weight and thrust are concentrated at regular intervals, so that the structure of the drum is not continuous but grouped into piers and connecting-walls, giving a series of recesses between the piers. The wall of the drum is carried up considerably above the springing-level, so that it gives abutment to the upper part of the dome and secures stability at the springing by its vertical weight. The church of S. George at Salonica offers a Byzantine instance which in many respects is remarkably similar in treatment.

The compound wall of the Pantheon represents an intermediate phase between the simple wall of the circular cella and the later development of aisles, and a further link is furnished in the so-called Temple of Minerva Medica. Here the articulation of the drum-wall into voids and solids is more perfectly attained, the sides of the decagonal plan being deeply recessed into apsidal chambers or exedræ. Above this lower stage a decagonal drum is raised, pierced with clearstory windows, and strengthened with buttresses which are built up from the piers between the exedræ. The dome springs above the arches of the clerestory, and the drum-wall is carried up externally.

In this instance the semi-circular chambers are separate from one another, and the next step was to connect them together by openings through the bases of the buttresses—thus forming abutment-aisles similar to those which had already been developed in the basilican plan. This is virtually effected in S. Vitale at Ravenna, where the plan-form of Minerva Medica is repeated octagonally and surrounded by an aisle, the exedræ being converted into arcades so as to open aisles and octagon into one area. The aisles are of two stories in height, the upper story forming the women's gallery, and they rise to the base of the central dome. Buttressing arches spring radially from the angles of the inner octagon across aisles and galleries at the two levels of their vaulting.

But it is necessary to differentiate between the thrust of the dome (which requires continuous abutment) and the thrust of the arcaded octagon (which requires abutment only at its angles). The function of the aisles in S. Vitale is to sustain the outward pressure of the eight arches which support the weight of the dome, and to give rigidity to its base. But the actual thrust of the dome is met by the same method as was used in the Pantheon, *i.e.*, by the carrying up of the drum-wall above the springing, thus absorbing the thrust by vertical weight instead of by horizontal abutment. This is especially clearly shown in S. Vitale, for the springing of the dome is stilted up to the arch-heads of the windows in its base, and the lower vertical portion rises clear from the surrounding aisles and receives no assistance from them in the way of abutment.

The internal transition from the central octagon to the circular plan of the dome is managed by the introduction of slight squinch-arches over the angles, thus producing a sixteen-sided figure, which easily merges into the required circle. The eastern side of the octagon differs from the other sides, for the gallery is omitted and the main arch opens to a square bema, beyond which is placed the ritual apse.

A somewhat similar design is the Church of SS. Sergius and Bacchus at Constantinople, which was built at about the same time as S. Vitale, and only a few years before the erection of S. Sophia. It is of an interest far greater than would be justified by its scale, for it is now almost the only representative of all the churches which were built in Constantinople before S. Sophia. It is still well-preserved, and it is not difficult to trace the influence which it exercised on the apsidal-design of the greater church.

The central dome is still represented on the ground-plan by an octagon, but the eight sides are not treated alike. The diagonal sides are still curved into arcaded exedræ, but the others are straight and set back to the outer faces of the piers. This inner figure is surrounded by an abutment-aisle of two heights, and its arcades open to the central area, as in S. Vitale. The alternating treatment of the sides of the octagon is full of interest and beauty, and it allows of the introduction of the open arch to the bema in a way that is more satisfactory than at S. Vitale. The dome rises immediately above the main arches, and its external wall is carried up in the usual way to give abutment-weight to the thrust of the dome; but, as an additional precaution, buttresses are built up from the piers of the octagon—recalling the arrangement of Minerva Medica.

The method of fitting the dome on its octagonal base is unusual, for the necessary modification occurs in the dome itself, and not in the octagon beneath it. The plan of the dome at the springing is not circular, but is formed by a sixteen-sided figure. Eight of the sides are continued up from the faces of the octagon below, and the eight intermediate sides are hollowed back to the angles of the octagon, so as to avoid overhanging. The plan thus produced at the springing gradually merges into a spherical form as the dome rises. The surfaces are so freely treated that it is difficult to describe them clearly, and they can be better studied in the measured drawings. It may be noticed that the arches which pass over the aisles and sustain the central octagon are not set radially, but are grouped in pairs on the four principal sides. The irregular shapes of the aisles are covered with continuous barrel-vaults, which are most ingeniously adapted to the variations of span.

Returning again to the plan of S. Sophia, it is at once evident that the elaboration of the apses is directly derived from such a design as the Church of S. Sergius. There is the same alternation of curved and rectangular forms, the same arrangement of arcading in two heights, a similar construction of abutment-aisles; and S. Sophia has more than once been described as the two halves of S. Sergius separated by a central square.

But, in adapting the forms of S. Sergius to the apses of S. Sophia, several alterations were made. Firstly, the three bays are disposed around a semi-circle, so that no modification of plan is necessary to pass upwards to the semi-dome. Secondly, the arches of the gallery-arcades do not intersect the semi-domes of the exedræ, but are placed below them. Thirdly, the semi-domes of the apses are not placed above the arch-heads of the three bays, but spring from the same level, and are interpenetrated by them. The reason of this last modification lies in the very different scale of the two churches. S. Sergius is a comparatively small building, and the abutment of its dome was sufficiently secured by the weight of wall carried above the springing, and by the buttresses applied to that wall; but the apses of S. Sophia are tremendous constructions of 103 ft. diameter, and the same methods would have been a clumsy expedient on so great a scale. The interpenetration with the lesser semi-domes and barrel-vault of the three bays gives efficient abutment to the great semi-domes at the critical point of their curvature, and, furthermore, reduces their weight. This ingenious distribution of thrust is typical of the whole design of the domes and vaults, and the thrust of the main dome itself is expended through the great semi-domes, the lesser semi-domes, and through the vaults of the aisles to the outer walls. The constructive genius of Byzantine design may well be said to have attained its highest expression in the engineering of this series.

The two essential parts which make up the main scheme of S. Sophia have thus been briefly traced—the central square domed compartment derived from the basilican plan, and the two compound apses derived from the radial type of plan—and it remains to speak of the adjustments necessary to their combination.

The central square is covered with a symmetrical design of dome and pendentives, and it has been shown that the natural plan-form resulting from such an arrrangement is the Greek cross, the arms representing the abutment of the four arches which support the superstructure. In S. Sophia the arms of the cross are developed to the north and south by the great buttresses which pass over the aisles and sustain the east and west arches of the central square; but the completion of the figure by similar extensions to the east and west is rendered impossible, owing to the application of the apses with their deeply-curved exedræ. Neither was it possible to depend on these compound apses for the abutment of the north and south arches, for their derivation from radial structures rendered them unsuitable to withstand such great linear pressure. Hence arose the necessity of mainly absorbing the thrust of the north and south arches within the central square itself, and this was effected by the insertion of an inner arch on each of these two sides. These inserted arches carry the main weight of the dome above, while the original square is still recognised by breaks of 3 ft. which, to some

degree, are decorative rather than constructional. The side of the square measures 103 English feet, the span of the inserted arch is 74 ft.; and the simultaneous reduction of opening and increase of pier secured the north and south sub-structure of the dome without any extension of abutment beyond the area of the central square. It is probable that a certain amount of thrust from the north and south arches is taken by the apses, for the arch-heads of the exedræ are at the proper height for such service, and their inclination on plan is not excessive; but it would be difficult to estimate the actual proportion of such thrust, and especially after the centuries of earthquake which the building has endured.

Thus S. Sophia gathers into a single design those basilican and radial principles whose development I have attempted to follow—not, perhaps, with much archæological accuracy, but rather by watching the evolution of progressive forms. But there is far more in the design of S. Sophia than can be accounted for by such a sequence. It may be possible to point to the source of all its various parts, and yet remain impossible to conceive how they were combined with such masterly perfection. It may be that closer links might have been furnished by churches which are now destroyed and unknown, but the wonder and delight of the Byzantines themselves seem to mark its conception as perhaps the greatest of those rare miracles which from time to time have crowned the finest periods of art. Such miracles can only arise from the gradual preparation of antecedent ages, the full devotion of a national enthusiasm, and the happy chance of a genius such as Isodorus who could crystallise the saturated aspirations around him in a single creative effort.

It may seem that I have dealt with the anatomical forms of the brick construction rather than its fair garment of marble and mosaic, but the one is inseparable from the other. There is an intrinsic beauty in the golden splendour of the mosaics, but they derive a higher quality from the curving domes and vaults which they adorn—the marble incrustation has a delicacy its own, yet only adds a grace to the power and grandeur of the walls. Byzantine building-forms themselves are full of inherent beauty, and whether they bear a wealth of gleaming colour, or whether left in white purity, they are but the fulfilment of the same Byzantine art.

Both Mr. Fulton and Mr. Reynolds showed a number of excellent lantern slides.

Mr. R. Phené Spiers, in proposing a vote of thanks to Messrs. Fulton and Reynolds, said that the papers they had had that evening were of a nature which one could discuss for a long time, and the difficulty was to restrict one's observations to the points at issue. There were two records found in Procopius in connexion with S. Sophia which were interesting, especially as they had had the opportunity of seeing the diagrams of the church. It was related that the masons at S. Sophia informed Justinian that the church was cracking and likely to fall. Justinian was reported to have visited the building and to have noticed that the wall which was erected as a centring—for centrings were sometimes used in Byzantine buildings—to support the eastern arch showed signs of cracking all the way down before the arch had been completed; Justinian was reported to have said, "Complete the arch at once, and then it will hold." Of course, the wall had been cracking in consequence of the weight on each side, and Justinian was supposed to have known so much of the theory of building that he saw that if the arch was completed the wall would not be crushed. The other anecdote was as to the arches over the aisle walls, where the masons reported that the columns of the aisles were being crushed. To a certain extent that was borne out by the fact that a great many of the columns of the aisles would seem to have sustained some damage and had been repaired by iron rings round. Justinian, it was reported, said, "Cut away some of the top of the arch wall, underneath the arch, so that the arch may have its proper bearing." That was done, and everything went right. There was no doubt that Justinian's architects were able men, and courtiers too, in having given Justinian the credit of knowing these things. Mr. Fulton had showed the figure of the Chora mosque—the mosaic mosque it was called—and said it was thought to be the prototype of St. Mark's. It was its prototype as it existed at the end of the XIth century. He remembered that when he was trying to reconstitute the original church of St. Mark's, he was fortunate in coming across a photograph of the church, and at once he saw features he wanted to reproduce. The five entrances to St. Mark's were originally covered with semi-circular roofs, which stood out in front of the main wall of the building. Now the spaces had been filled up, and a balcony has been constructed over the projecting porches. He read a paper before the Association in 1893, when he had some large original drawings showing the original design of St. Mark's as it had been carried out at the end of the XIth century, and the paper was published in the *Builder*. The drawings were prepared, firstly, from the most accurate plans; and secondly from a number of drawings which had been made by a former member of the Association, he thought, and a travelling student of the Royal Academy—Mr. William Scott, who was at St. Mark's at the time they were restoring the church. He did not know to what extent it would be fair to go back to the early periods to which Mr. Reynolds had taken them. There was one point which he did not think had been sufficiently considered, and that was as to the real construction of the Pantheon walls. Mr. Reynolds said that the walls rise above the springing of the dome, but he had not dealt with the fact which was brought to our knowledge by M. Chedanne—that the construction of the dome of the Pantheon was different from that which was usually carried out by the Romans. M. Chedanne found that up to the level of about the third coffering all the bricks were laid in horizontal beds, slightly—very slightly—falling outwards. That, of course, was an entirely different method of construction from the ordinary vaults that we knew of in Rome, and, thinking of the subject, he (the speaker) remembered that he had seen similar specimens in the south of Italy. There were buildings at Baiæ, near Naples, which had not, he thought, had the attention paid to them by students that they deserved. They were called temples, but they were, of course, portions of public baths, of great size, almost equal to the Pantheon, and apparently built in the same way—that was to say, the courses were all horizontal and built in stone—small stones. One of them, of which half had fallen down, afforded an opportunity of seeing the construction from top to bottom, and enabled one to see another aspect, *i.e.*, that, seen in section, it formed a pointed arch. It had nothing to do with the principle of the pointed arch, but it was evident that with masonry laid in horizontal courses there would be a difficulty experienced by the workmen when they got up to a certain height, in covering over the top, so they raised the upper portion of vault and that gave the effect of the pointed arch. It had made him think that in constructing the vault of the Pantheon with horizontal beds, there must have been some other buildings of the kind near which had suggested to the builders that this was the best means to adopt. The Baths of Agrippa were on the south side of the Pantheon, and in the plans shown that evening of that building they saw an immense hall like that of the tepidarium of the Baths of Caracalla; but he had reason to doubt the plan drawn by Palladio, who, because he found that all the other baths had a great hall, put one in his interpretation. His (the speaker's) ideas were modified when he came across a plan in a pamphlet in the Institute Library, where a different feature was shown. In the middle of the hall, which was supposed to be the tepidarium, were the remains of a large circular hall, which was more probable, as it always seemed to him to be a strange thing that in the age of Agrippa they could erect one of those immense vaulted halls like the tepidarium. As soon as he saw the plan in the Institute pamphlet he recognised that the circular building was more likely to be the type of the plan adopted in Agrippa's baths. The pamphlet was by Count Nispl-landi, and, if the plan was correct, this circular building was the famous Laconicum which was spoken of as having been erected by Agrippa. There were two or three others of the same type. There was the very well-known one at Pompeii which was perhaps not more than 25 ft. in diameter. It consisted of a circular hall, and it was covered by a conical vault, built of stones in horizontal courses, and a circular opening at the top. It seemed to him that when the architect of the Pantheon was going to erect his great hall he may have thought it possible to curve the sides so as to make a great semi-circular vault, and so he built the vault like that of the Laconicum. Mr. Reynolds's paper required more thinking over. There were other halls which he (the speaker) knew in which there was a type of vaulting recalling some of the features to be seen in the Church of SS. Sergius and Bacchus. There were two in Hadrian's villa at Tivoli in which the vaults are formed by a series of zones similar to those at St. Sergius, and the only difference was that the zones were intersected by vertical walls instead of descending on to a horizontal plane. There was the great hall of Serapis in Hadrian's villa, which was only a semi-circle, with a diameter of 80 ft., and with the same construction as in the church at Constantinople. Mr. Reynolds's paper was extremely interesting. If he had taken up S. Sophia alone there would have been quite sufficient material. They were glad to welcome Mr. Fulton and Mr. Reynolds back, and to find that they had made such good use of their time.

Professor Lethaby seconded the vote of thanks, and said he had been greatly interested in the papers, and he would be glad to see the drawings and photographs more at leisure.

Mr. R. Weir Schultz said that Mr. Reynolds's paper was very interesting, and it was pleasing to find that he had approached the study of Byzantine architecture from the constructional point of view—from the point of view of scientific building. That seemed to him to be the right way in which the study of all architecture should be approached and looked at, and it was very hopeful for the future to find that students were beginning, as Mr. Reynolds had done, to study past architecture from this point of view. He thought it was a point which should be put very strongly, that it was the real point of view from which to study past architecture from. One saw the ideas and the difficulties and the way things had developed and the way the next generations had thought to go one better and work out something finer, and one saw where they over-reached themselves and where they had succeeded so finely. If we tried to do our work in the present day in the same way, and studied it from the point of view of building and the proper use of material, we should get some really fine modern architecture. That seemed to him to be the only way to get real modern architecture.

Mr. Theodore Fyfe said that he thought they were all much indebted to Mr. Fulton and Mr. Reynolds. He could endorse everything that Mr. Fulton had said about the mosaics in the Kachriyeh Dzami at Constantinople. Mr. Reynolds had given them a really valuable contribution to the study of Byzantine planning. It was clear that he had studied his authorities, as well as the actual material on the spot. S. Sophia was unique, as the lecturers had said, but interesting approximations to its plan existed elsewhere; in particular the church at Koja Kalessi, in Isauria. The great diversity observable in the plan forms of this period was more apparent than real. In Constantinople four such seemingly different churches—SS. Sergius and Bacchus, S. Sophia, the Holy Apostles, and S. Irene—were all built on the same formative principles, as Mr. Reynolds had shown. It was curious that S. Sophia had remained unique, while the other forms had been handed down. S. Irene, for instance, appeared again in S. Antonio at Padua, some Renaissance churches, and in our own time in Mr. Bentley's great cathedral; while the type of the Church of the Nativity at Bethlehem had survived as the prevailing Latin cross plan of mediæval times. He wished cordially to support the vote of thanks.

The Chairman then put the vote of thanks to the meeting. One of the things which had struck him was the symmetrical and self-contained planning of the buildings illustrated, the marvellous arrangements of the squares and circles was wonderful, and the treatment of the domes showed that the builders of these churches were masters of their art. The way that Mr. Reynolds had treated the subject should be of great help to students. They had had excellent papers that evening.

The vote of thanks having been agreed to, and Mr. Fulton having briefly replied,

Mr. Reynolds said, as to the dome of the Pantheon, that it might be argued theoretically that there would be no thrust, on account of the construction in horizontal courses; but the fact remained that its builders took very elaborate precautions to abut such a non-existent

thrust. The explanation probably lay to some extent in the timidity of the builders, but still more in the difference between theoretical and practical building. Such a dome could only be regarded as having no thrust under ideal conditions, and a disturbance by earthquake or settlement, or even by the weakening of age, might well produce considerable thrust on account of its general form, and the added abutment was a very practical precaution. In the same way, the dome of S. Vitale might be said to have been thrustless, considering its construction of hollow tubes inserted into one another in a continuous ascending spiral; but the slightest failure would inevitably set up a tendency to spread which was evidently foreseen and provided against.

The Chairman announced that the next meeting would be held on February 10, when Mr. C. S. Spooner would read a paper on "Church Fittings."

The meeting then terminated.

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

I.—Law Society's Hall and Gaiety Restaurant.

For the first excursion of the current series, held on Saturday, the 28th ult., two important London buildings were selected, both of which contained much that was valuable to a student; but it may here be said that too much was attempted in an afternoon, for time prevented a thorough study of both subjects for which facilities had been granted.

At the Law Society's Hall in Chancery-lane the members were received by the Secretary, Mr. E. W. Williamson, and conducted to the older parts and then to the more recent additions to the premises. The former contain many well-proportioned and dignified apartments, in some of which the principal effect is obtained from a large classic order having scagliola columns and pilasters imitating red granite and porphyry. Various well-known architects have been employed to make additions—notably the late Philip Hardwicke and Edward Vulliamy, and their work in the library, council room, and hall is of considerable interest. But it was to the recently completed wing, opened by the King in June, 1904, that the attention of the visitors was especially directed. Here the architect, Mr. H. Percy Adams, explained the difficulties of his work and gave much general information. We must refer our readers to a full description and exterior and interior views of the extension which appeared in our pages of April 23, 1904, and confine our present remarks to some generalisations. The first impression is one of acute contrast in the early and the latest work. The lifeless tones and general orthodoxy of the XIXth. century work gives place to living colour and vigorous originality without any loss of dignity. The Common Room, the chief apartment of the new wing, is a stately chamber, cleverly and happily contrived to meet the limitations in lighting and the quiet comfort of the occupants. The decorative power of the combination of Cipollino marble pilasters, dark mahogany wall panelling, and Della Robbia friezes is very considerable; yet, curiously enough, the internal and external scales of this part of the building appear to be quite at variance. The refreshment-room and club smoking-room are tasteful in their oak-panelled treatment, but the new main staircase lacks importance from the absence of a more open and extended view.

The courtesy of the Society in admitting so large a number of strangers was much appreciated, and the magnificence of the house prompted comparisons with the limited premises tenanted by the leading body of British architects.

At the new Gaiety Restaurant a good deal of heavy stone construction and some delicate ornamental plaster decorations were the chief points of interest. Mr. Ford, of Messrs. Runtz & Ford, the architects of the work, received the visitors and kept them informed upon the intricacies of the plan. In general the building comprises on the ground floor a large central entrance leading to the restaurant at the back of the site, and on the left is a public buffet, while to the right the famous "Short's" wine bar, now standing isolated in a temporary erection, is to be housed.

The first floor contains a ballroom, private dining-rooms, and a suite of Masonic rooms, of which the banqueting-hall is "Byzantine" vaulted in plaster, the effect of which on ordinary taste is unpleasant, whatever may be the requirements of the craft. There is a grill-room and a large kitchen in the basement, and the remainder of this large structure is divided into small residential suites suited to the needs of bachelors.

Much has been said in public about the overpowering effect of the height of this building, and it is further to be deplored that the praiseworthy effort of the London County Council to acquire uniformity in the design of this vast Strand improvement, as evidenced by the competition held some years ago, should have proved abortive. These great Portland stone façades, the cornices of which project 4 ft. 9 in., are, in the main, designed by Mr. R. Norman Shaw, and it must be said that, in the absence of conforming to the lines of the adjoining building, the external expression has a more truthful reflection of the interior than its neighbour possesses.

Many members were interested to observe that our great governing authority is flexible, upon its own estate, in the matter of vexatious points of construction, and has banished all soil and other waste pipes from the fronts.

THE SURVEYORS' INSTITUTION.

The usual fortnightly meeting of the Surveyors' Institution was held at No. 12, Great George-street, Westminster, on Monday evening, the President (Mr. H. T. Stewart) in the chair.

The Secretary read the minutes of the last meeting, which were confirmed.

The Late Mr. Blashill.

The Chairman said that since they last met the Institution had lost an esteemed member of the Council and a valued colleague by the death of Mr. Thomas Blashill. It was not his intention or wish to dwell that evening upon the merits of their lost friend and upon his high qualities—they were known to them all. He could not, however, allow the opportunity to pass without paying some small tribute to the qualities which enabled him, without any influential connexions or any particular social advantages beyond those which were common to all of them, to attain to the important and responsible position of superintending architect of the L.C.C., and also to a seat on the governing body of that Institution, as well as a kindred institution. Some of them did not, perhaps, on all occasions see eye to eye with him on questions of public policy, but none of them failed to recognise and appreciate the honesty of his purpose and what he might term the spirit of superb independence which characterised all Mr. Blashill's words and actions.

Rural By-laws.

Mr. Herbert Smith resumed the discussion on the papers read by Mr. A. R. Stenning and Mr. R. Menzies at the last meeting of the Institution, and reported in the *Builder* of January 21. He said that probably all present had had some experience of the working of local by-laws, and had come to the conclusion that some reform was necessary with regard to this important question. The by-laws, which, taken as a whole, had been of considerable benefit, were founded upon the Public Health Act of 1875, but in his opinion in country districts a great injury to public interests had occurred by the mischievous attempt to adopt the by-laws of London. Many by-laws were so absurd and drastic that they were injurious in several directions. First, they prevented the building of the necessary number of cottages for the proper housing of the rural population; secondly, they were burdensome to the land-owners who had suffered much through agricultural depression; thirdly, they stopped speculation, and, in consequence, stagnated trade; and fourthly, they were often productive of very ugly buildings, and prevented houses being built which would be in harmony with rural surroundings. For a number of years he had been a district councillor and chairman of a parish council, and he did not want to criticise too severely the constitution of those councils. As, however, Mr. Stenning had pointed out, the power of selection had been placed almost entirely in the hands of the small voters, who were not responsible directly for the payment of the rates, and this in many cases had resulted in the election of men who, although for the most part honest and conscientious, were hardly competent people to decide and judge on the magnitude of the interests committed to their charge. It might seem a strong assertion, but he did not hesitate to say that the greatest enemies to the proper housing of the working population in rural districts were those who proposed to look most after their interests. If the new model by-laws of the Local Government Board were without exception adopted in rural districts a much more satisfactory state of things would exist. Rural England would then be rural England under one set of by-laws. Now, however, it was under by-laws compiled for the most part by unqualified persons from urban by-laws, which, as had been stated by Mr. Vernon, were bewildering in their inconsistency. Not long ago a landowner applied to him to purchase for a client a small piece of land, on which he was desirous of building cottages for workmen. He said that the by-laws in the district in which his estate was situated were so drastic and unreasonable that it was impossible for him to build in his own district. An instance of extraordinary inconsistency with regard to building by-laws was told him a short time ago. A labourer lived in a cottage which was condemned by the local authority, and that labourer was allowed to build a small corrugated iron building on an allotment, which was in every way inferior to the condemned building, and live in it. He could not vouch for the truth of that story, but if true it would take some beating. In densely-populated urban districts it was undoubtedly right to have a fireproof wall continuing through the roof, but there could be no necessity for such a thing between a pair of labourers' cottages, which might be far away from any other building. In his opinion far too much was made of the danger of fire. As a matter of fact, the sill of the bedroom window of a cottage was seldom more than 12 ft. from the ground, and persons could easily drop from that on to the ground. But in addition the word "fireproof" was quite a misnomer, because in numerous cases structural timbers were allowed to run through the walls. The walls were a source of expense; it was serious in the case of a plain square built cottage, and much worse if the cottages for convenience or picturesqueness were built in other forms and shapes. He felt also that the by-laws had a tendency to destroy the beauty of rural England, for very many ugly buildings had their origin under them. One of the most picturesque style of cottages, all people would agree, was the half-timbered cottage; but that, he was told, was absolutely prohibited by some building by-laws. Then, again, in many country districts they were required to deposit copies of drawings with the district surveyor, although the deposit of plans had never been the practice in London. These drawings were expensive to the builder and owner, and served no useful purpose, and it was hardly fair on the ordinary practising surveyor that these plans should be in the keeping and at the service of the district surveyors, many of whom took private practice. He was inclined to think that district surveyors and inspectors of nuisances should be whole-time men. He agreed with what had been said on the subject of roads. Could anything be more unreasonable than that a road should be 36 ft. or 40 ft. wide which was a continuation of a road half that width or where the road led into an old road of far smaller proportions? As regarded sanitary matters, no doubt great benefit had been derived, but there was now a tendency to exaggerate the requirements of many districts. He had lately had a case in point. He had just completed a new road down which ran a sewer from 11 to 14 ft. in depth. The plots in the road were not more than 18 to 20 ft., and were for small houses, and yet the district council insisted on having eyes put into the sewer for every plot. He would do the district surveyor the justice to say that he did not approve of the order, but the council insisted, and he had been obliged to make the sewer, as it was part of a scheme with another landowner in which the district council were themselves taking part. When the new model by-laws of the Local Government Board came out there was great rejoicing, but the period of rejoicing was small. It was soon found that the new model by-laws were simply for the guidance of those authorities who had not framed by-laws, and that they were not intended to supersede the by-laws which were already in existence. No doubt if there was an appeal tribunal against the

unreasonable demands of local authorities it might have a tendency to keep these authorities in check. A tribunal limited to important points might be constituted in the manner which had been suggested in the papers, and this, combined with a uniform set of reasonable by-laws to be adopted throughout rural England, would be conducive of much good, and would be of great benefit to the rural working classes. He did not know whether he would be in order in moving a resolution, but if so he would like to move: "That the Council take some action either alone or in co-operation with the Royal Institute of British Architects for pressing upon the Local Government Board the importance of such revision of the local by-laws as would remedy some of the evils and hardships so frequently complained of, especially in rural districts, as tending to discourage the efforts of landowners and others to improve cottage accommodation on their property."

The Chairman said it would not be in order to move that as a resolution.

Mr. Smith said he would put it as a suggestion to the Council coming from a private individual. It was a matter of real importance to the country that the by-laws should be made uniform.

Mr. MacMorran, K.C., said he dealt rather with the construction of the building by-laws, and he found himself largely in agreement with the statements made in the papers. The idea of by-laws as he understood by-laws was this—it was a form of legislation relegated to the local authorities, who were entrusted with certain powers in respect of matters which were peculiar to their locality. In so far as matters related to a community generally there should be one code and one legislation for the whole. He did not mean to say there should be one code equally for urban and rural districts, but there were certain matters on which they all agreed which should pass into legislation, leaving by-laws to deal with matters of local peculiarity and interest. It seemed to him that they had outgrown the need of by-laws for all purposes connected with new streets and buildings, and the time had come when they should have a building Act capable of being understood by everybody, with perhaps power to the local authority to have this varied by by-laws where the necessities of the locality required it. That would give a certain elasticity and at the same time it would afford a general certainty, which, of all things, was important in matters of this kind. The by-laws did not date from 1875, but they were made under the Public Health Act of 1848, when they knew little about these things, and the time had come when a general consideration of the whole subject was urgently required. As things stood now, by-laws were supposed to be made for urban districts, and he agreed that a mistake had been made hitherto in granting the rural districts the same by-laws that up to this time had been in force in urban districts. Still, the rural councils could not get these powers without the consent of the Local Government Board, and it had to be remembered that some of these rural districts were only rural so-called. Take Croydon, for instance, where in the rural district there was a population of more than 30,000 people, and where the by-laws required to be equal to those of urban districts. The fault he found with the model by-laws as they stood was that they had made no progress for years. Faults and flaws had been found in them, but no attempt had been made to put them right, and once a by-law was made there was no means of altering it except on the initiative of the local authority itself. Mr. Stenning had pointed out that there was no definition of a new building, and surely that was a matter which required to be put right. Then the by-laws said every person must make a new road 36 or 40 ft. wide, but if a landowner built fronting on an old country lane he could build right up to the road. Then, again, if a man made a new street he was required to provide at one end of it an entrance equal to the width prescribed for the new street. That was a very ambiguous by-law, and its meaning had been left in great doubt by the legal decisions. He believed it meant the width of the street where it opened on to another road, but others said the entrance was the means by which they got into the street, and if that was so it would be impossible to make a new street opening into a street of less width unless they widened the street into which it opened. He felt that the whole of the by-laws from beginning to end required revision by professional experts who knew where the shoe pinched, and that there should be something in the nature of a building code which could easily be agreed upon by a committee of the Institution, the Royal Institute of British Architects, and the Engineers. The Local Government Board had always set its face against allowing a local authority to dispense with its own by-laws, and this had led to great hardship; but still they could recognise that to give the local authorities dispensing powers might lead to abuses which it was desirable to avoid. There was a simple remedy, however, for that, which was to have, as Mr. Stenning suggested, a tribunal following on the lines of the London Tribunal, whose decisions they all respected. They might easily have half a dozen such tribunals for different parts of the country, and the decisions of the local authorities might be reviewed by these impartial and responsible tribunals.

Mr. Eve said that the only flaw in Mr. MacMorran's suggestion was as to appeal. Of course, if the local authority did not exercise its power in favour of the applicant the applicant would appeal, but who was to appeal if the local authority favoured a particular applicant? Although he agreed that some revision of the by-laws was necessary he hoped they would not go to the other extreme and make them too lenient. For instance, there seemed a tendency to narrow the width of streets, and to that he was entirely opposed, for they knew now the enormous cost of widening narrow streets. He hoped, therefore, if there was to be a change from the 36 ft. street it would be in the direction of increasing the width rather than decreasing it. Mr. Stenning had referred to the difficulty of knowing what was meant now by the width of streets, but it seemed to him that the Act was quite clear. The reason why it was stated that footpaths should be on both sides of the street was to prevent some cantankerous man putting both footpaths on one side. He had had to deposit plans in rural districts, but it was somewhat different to London, where the district surveyor was always accessible. As to the suggestion of the local surveyor making use of the plans, he could do that by observation of the buildings if he liked. He certainly thought there should be some definition of a new building. He was a strong advocate for the omission of the party wall through the roof, and he felt that they were too much afraid of fire. To talk of fire being dangerous in houses of two floors appeared to him to be absurd, and party walls through the roof added materially to the expense, and also added to the chance of water coming through the roof. In addition their omission certainly added to the appearance of a row of cottages. Where old roads were brought in for building purposes there should be some requirement for them to be widened.

Mr. H. J. Elwes said that this discussion had been brought about by the action of Sir W. Grantham. His experience of rural councillors had not been so bad, and they did not make objection to any reasonable infringements of the by-laws. Some time ago he had the misfortune to own some cottages in a cathedral town in the south of England. People had lived in those cottages for generations and brought up large and healthy families in them. A new man came on to the council and began to attack the landlords. He told the council that if he was expected to put those cottages into what was called modern repair he should burn them down. The council took no action. He had had experience of living in wooden houses, but architects and builders seemed to ignore the fact that wooden houses, which were healthier than many of the brick-built houses, could be built, and that if built in the right way they were durable. He had lived in an oak-built house in Massachusetts which was built in 1704, and had never had a coat of paint on it, and it was sound and weather-tight to this day; while in Switzerland he lived in a house built of larch logs more than 400 years old. It appeared to him that building by-laws were not necessary at all in ninety-nine cases out of a hundred, although there might be some power given to local councils to condemn houses which were obviously insanitary. If they could give the utmost liberty to landlords consistent with decent sanitation it would encourage them to build modern houses, and it would encourage builders to use English timber, which they did not do at present. He had offered a prize for the best plan and specification of a cottage to be exhibited at the Garden City Show in August, and would be pleased to give his ideas, which were based on experience in Japan, America, and many parts of Europe, where he had lived in wooden houses, and would like to do again.

Mr. Done said that no doubt in rural districts which were in reality urban districts there were considerations which applied which did not enter into his own professional practice, and which scarcely touched the question of rural housing. The number of such places was comparatively small, but outside of them was an enormous part of the country which was regulated by by-laws of the most drastic character, and where many things were provided for which could not possibly happen. Speaking of purely rural districts, the question of road-making did not apply. They never made any roads, and probably never would, and by-laws as to road-making never entered into the practice of a purely rural land agent. They had got into a muddle on this question, and it was difficult to say who was responsible. It was quite true that those composing rural councils were not as a rule qualified to make by-laws, but he knew a case where the local authority, feeling themselves unqualified to frame by-laws, asked the land agent of a well-known nobleman in the neighbourhood to draw them up, and that gentleman framed the most extraordinary set of by-laws he ever saw. He had a case where he was building a pair of cottages, and he gave 18 ft. by 10 ft. for the bedroom, and he was told that it would not meet the requirements of the by-laws unless the rooms were reduced to 14 ft. by 10 ft. In the end the local authority winked at it, and he built the cottages. He had read in several responsible journals which were commenting on the case of Sir William Grantham that the whole trouble arose through landlords trying to get out of their responsibilities. It was not, however, a landlords' question. They did not build these cottages for fun but for profit, and if they could not build them on reasonable lines it was perfectly clear that they would not build them at all, and the unfortunate people who wanted houses would suffer. He did not think, however, that it was the poor people themselves who wanted these drastic requirements, and so far as he was concerned he would be perfectly willing to leave it to the workpeople themselves. Agriculture was a business in which the margin of profit was small, and it was, above all, a business of temporary expedients, and if they were tied down with regard to their buildings in the way many of them were they were being placed in an impossible position as compared with their competitors on the other side of the water. He knew a case where he supplied a farmer in Middlesex with fencing materials, and, on visiting that man afterwards, he found he had built an addition to two cottages, giving him two extra bedrooms, which were used when the harvesting season was on. That man had actually used the fencing rails for joists. He told him it would not do to dance in the rooms, and the farmer said, "We do not want to," and that was the whole question. He endorsed Mr. MacMorran's idea of an appeal tribunal, but he felt that if district surveyors were allowed a dispensing power their position would be intolerable. He believed that a code such as advocated by Mr. MacMorran would largely get rid of their difficulties, but what he did place great value upon was the setting up of some tribunal of appeal which would give a decision which would carry weight and satisfy sensible men.

Mr. Reed (Building By-laws Reform Association) remarked that if they were to have a remedy for the present state of affairs it must be by legislation. There were 1,100 odd urban councils and 666 rural councils, and in ten years the Local Government Board took credit for having passed over 1,200 sets of by-laws. If they had a perfect code to-morrow how were they going to get it put into practice? If they were to wait until the whole of these districts adopted new by-laws they would have to wait for many years. He considered that a short Bill containing a few provisions amending the Public Health Acts would do what was required.

Mr. Williams said he was associated with the National Workmen's Housing Association, which was composed of men who wanted decent, commodious houses. This agitation had gone on for some months, and really resolved itself around the question of good houses for workmen. Without desiring to impute anything, he was forced to ask whether the agitation was quite sincere. By-laws had been adopted in about half the rural districts in England, and if the agitation was sincere why was there not a revival of house-building in those districts where there were no by-laws? He went about

Hampshire and found villages where the cottages were allowed to fall into disrepair, and where no new cottages were built, and the inhabitants had to go away to the towns. As an architect he found no difficulty with by-laws because he hoped everyone in the profession was above by-laws. It was said that the by-laws prevented the building of good houses, but he joined issue there. It was impossible to prevent the building of good houses, because they knew that many bad houses were built. What was the reason for all the trouble? It was to be found in the remarks which fell from Sir W. Gunton before Mr. Long. Sir W. Gunton, like Mr. Wilfrid Blunt, desired to build cottages without interference from the district councils. He did not say that Sir W. Gunton would build an unhealthy house, but if he was allowed to build without interference the result would be that others would come along who would build unhealthy houses. The trouble Mr. Stenning had was not so much with the by-laws as with those who administered them. On this question of representation, however, if builders were not to be on local authorities then neither architects nor surveyors should be members. He was astonished that Mr. Stenning should suggest narrow roads, and, so far as the deposit of plans was concerned, it was a small matter. He hoped that whatever was done in the way of amending the by-laws it would result in good houses only being built.

Mr. W. Woodward said he would like to assure Mr. Williams that they in that room were perfectly sincere in trying to amend the by-laws in a manner which would result in benefit to the working classes. There was no desire to have any jerry building or unhealthy dwellings, but they desired to erect the cheapest possible dwellings for the benefit of the men whom Mr. Williams represented.

Mr. Williams said he did not suggest that the Institution was not sincere, but the agitation outside.

Mr. Hudson suggested that, as many others would like to speak, and the hour was late, they should be invited to send their views in writing to the secretary for publication.

The Chairman said if there was a desire on the part of many members present to speak on the subject, the discussion could be adjourned.

Mr. Woodward moved, and Mr. Hudson seconded, the adjournment of the discussion till the next meeting, and this was agreed to.

PORTLAND CEMENT.

On Wednesday evening, at No. 9, Conduit-street, W., before the members of the Builders' Foremen and Clerks of Works' Provident Institution, Mr. H. K. G. Bamber (managing director of the Associated Portland Cement Manufacturers, 1900, Ltd.) read a paper entitled "Some Notes on the Modern Manufacture of Portland Cement and Practical Testing Thereof." Mr. John Beer presided.

Mr. Bamber, after referring to the well-known history of the invention of Portland cement, said that the old process of mixing together chalk and clay in definite proportions was a difficult matter when it was remembered that it was only in recent years the assistance of the trained chemist had been utilised to check the composition in the early stages of manufacture. For many years the consumer, knowing little or nothing of the material he was using, was entirely in the hands of the manufacturer as to the description of cement supplied, and, no doubt, this monopoly with the manufacturers of what knowledge there was on the subject was the cause of this great industry remaining for so many years unenlightened and following the initiatory unscientific practices of its infancy. The development of research and the carrying out of properly-organised investigations into the manufacture and properties of Portland cement, more especially in Germany and America, compelled the English manufacturer, who had been somewhat tardy in this direction, to set about putting his works in order and remodelling them on scientific lines. The extension of knowledge of the subject soon resulted in other calcareous and silicious materials being experimented with for the manufacture of cement, and in many cases materials other than chalk and clay had been found suitable under proper methods of manufacture for the purpose, with the result that works had sprung up in various parts of the country, but in no case were the materials so eminently adapted for the manufacture of the best quality of Portland cement as the chalk and clay found in the cradle of the industry on the Thames and Medway. Another result of the more general knowledge of the subject was the framing by the consumer, or rather by his architect or engineer, of many and various specifications, whereby his intention was to insure the provision for himself of a cement having certain qualities and peculiarities which conformed to his own ideas on the subject. It could readily be imagined how the difficulties of the manufacturer had in this way been increased; but, fortunately, the matter was now having the attention of the Cement Section of the Engineering Standards Committee, and it was hoped that, as the results of their deliberations, a standard specification of the quality of cement, together with details as to the methods to be employed for testing the same, would be shortly compiled and published, to the mutual advantage of the consumer and the manufacturer. Mr. Bamber proceeded to describe the various processes of the more modern manufacture adopted at the works of his company, and illustrated his remarks with a series of cinematograph pictures and lantern slides which represented the actual working at the Associated Portland Cement Company's works. To get the materials mixed in exactly the proper proportions there is a most careful and continuous system of sampling and analysis, the chemists taking samples every fifteen minutes. The next important step was to see that the materials were thoroughly amalgamated, and in modern cement plants so perfectly is this part of the operation carried out that at least 96 per cent. of the chalk and clay delivered to the mixing and grinding mills is capable of passing through a sieve having 32,400 holes per square inch before it is delivered by the mill for conveyance to the storage mixers. The second part of the process was the calcination, generally carried out by the rotary kiln, and the third process was the reduction to powder of the cement clinker, which was obtained by means of several classes of machinery all of a heavy and powerful kind, necessitated by the extreme hardness and refractory character of the material to be pulverised. Proceeding to the question of testing, Mr. Bamford gave the following analysis showing the chemical composition typical of the bulk of cements in use:—Silica, 22·00; insoluble residue, ·75; alumina, 7·60; ferric oxide, 61·90; magnesia, 1·25; sulphuric anhydride, 1·50; carbonic anhydride, ·25; water, ·75; potash, soda, and loss, ·45; total, 100·00. It was customary with a high class of Portland cement to grind to very great fineness, but in making a test care must be taken to see that the sieve used was made of correct standard wire. The test of specific gravity had superseded the "weight per bushel" and was a much more reliable test. It was not affected by the fineness of grinding, which destroyed entirely the weight per bushel test. This test was applied as a measure of the calcination to which the cement had been subjected, as should there be any considerable proportion of under-burnt or lightly combined clinker present in the cement, which would be likely to cause unsoundness, the specific gravity would fall below 3·125, which was taken approximately as the standard for well-burnt cement. The cement supplied by a manufacturer to a required setting time might vary considerably in its setting characteristics in accordance with the amount of aëration to which the sample was subjected, and this unavoidable variation, due to atmospheric causes, was a fruitful source of trade disputes. The cement should as far as possible be tested as received. The method of testing the setting time most in favour was that of the use of a weighted needle having a point 1-16th in. square and weighing in all 2½ lbs. In gauging the pat for this test sufficient water should be used to produce a plastic mass, but care must be taken not to use an excess of water. Much had been written about the tensile strength, and in the hands of the expert there was little difficulty in conducting this test, but in the hands of the novice the reputation of the manufactured article was everlastingly trembling in the balance. He emphasised the necessity of seeing that the apparatus and tools are clean and suitable, and that the moulds for making the briquettes should be clean and thoroughly free from excess of lubrication; neat cement should be taken in weighed quantities; the water, thoroughly clean, always measured; and the briquettes always made singly. For sand tests none but the standard Leighton Buzzard testing sand should be used. The test for soundness was perhaps of more importance than any other test to which cement was subjected, and the tests consisted chiefly of exposing a set cement to various high temperatures in water in order to hasten the ultimate results likely to be obtained under various climatic conditions. Many tests of a more or less stringent character had been introduced, the most severe being the boiling test. There are various methods of carrying out this test, but the most rational and severe is that known as the Le Chatelier method. It was the most stringent test for soundness in use, and had an advantage over all other tests, which only recorded expansion without any means of measuring the amount of same. It erred, however, on the side of severity, as thousands of tons of cement manufactured in the past—which had resulted in splendid work—and much cement that might be manufactured in the future, which might also do good work, would fail to pass this most stringent test. Cement, however, that would pass this test would pass any other of the many hot tests known to the trade, and must of necessity be of a high-class character, thoroughly well manufactured, and such that would give satisfaction under any normal conditions. It was cement of such description that it was the aim of the British manufacturer to produce.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday, in the County Hall, Spring-gardens, Mr. J. Williams Benn, M.P., Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed that the following loans be granted:—Camberwell Borough Council 11,540*l.* for erection of lodging-houses; Deptford Borough Council 5,000*l.* for property for housing purposes; Hammersmith Borough Council 18,482*l.* for electric lighting purposes; and Southwark Guardians 4,500*l.* for sanitary work at Champion Hill Infirmary. Sanction was also given to the following loans:—Hackney Borough Council 2,160*l.* for electric light purposes, etc.; Hampstead Borough Council 5,075*l.* for paving stoneyard; St. Pancras Borough Council 20,000*l.* for purchase of property under Part II. of the Housing of the Working Classes Act, 1890.

Drains of Non-Provided Schools.—The Education Committee reported that the Council, on December 13, 1904, sanctioned an expenditure of 850*l.* in connexion with the investigation of the condition of the drains in the non-provided schools, and the Committee now reported that, in pursuance of this resolution, active steps are being taken to proceed with the work. . . A letter (January 12, 1905) had also been received from the Rochester Diocesan Board of Education as follows:—

"I yesterday saw Mr. Bailey, the architect of your Education department, and desire to repeat in writing the representations which I then made to him orally with reference to the examination of the voluntary schools in the London area, now proceeding. Your Council is probably aware that the borough councils claim that they (acting through the medical officers of health) have primarily the sole right to test drains within their respective areas. While I would assure your Council that the managers of the Voluntary schools of South London desire that the sanitary arrangements of their schools should not be only perfect, but beyond suspicion, I desire to point out that those managers must be assured that they are obeying the right authority before they can be expected to spend money on altering or reconstructing their drains. As the matter stands, the medical officer of health claims that he has sole primary jurisdiction in this matter and that his certificate of soundness is a complete protection. May I be informed whether the proceedings being taken by your officers are intended to be under the Education Act, 1902, or the Public Health Acts? The question is important. We have counsel's opinion that the power to 'inspect' the school given to the local education authority by the Education Act, 1902, does not justify any physical interference with the drains. On the other hand, the Public Health Acts in London require that twenty-four hours' notice of the proposed examination should be given. It is contended by the managers of some schools that the action of the officers of the Council in opening drains without notice and without the authority of the medical officer of health, is distinctly *ultra vires*, and that they will be entitled to recover for any damage caused thereby. It seems difficult to dispute this contention, especially where the managers are further protected by the certificate of the medical officer of health that the drains are sound. Apart from the legal aspects of the question, I am instructed to suggest to your Council that where so important a matter as the drainage of a school is concerned, notice given to the persons concerned before any examination is made would tend to the smooth working of the Act."

The Committee reported that they had arranged that due notice shall be given to managers of the date when the Council's officers propose to visit non-provided schools to inspect the drains, and they recommended :—

"That the Secretary of the National Society, the managers of the under-mentioned non-provided schools, and the Secretary of the Rochester Diocesan Board of Education be informed that the drains of all non-provided schools are being inspected by the Council's inspectors in pursuance of the resolution of December 13, 1904, and that this work forms part of the general survey; and that arrangements have been made whereby due notice shall be given to the managers of the date when the Council's officers propose to visit the schools to inspect the drains."

Mr. Whitaker Thompson moved that the following words be inserted in the recommendation, *i.e.*, that in cases in which the managers can show that their schools have been inspected and drains tested by the local sanitary authority during the last twelve months, the Council will be satisfied if the requirements therein made have been complied with.

Mr. Hunt seconded, but on a division the amendment was lost, and the Committee's recommendation was agreed to.

Holborn to Strand—Gaiety Theatre Company.—The Improvements Committee brought up the following report :—

"It is provided in an agreement between the Council and the Gaiety Theatre Company, dated May 6, 1901, supplemental to the agreement dated June 23, 1899, referred to in the Council's Improvements Acts of 1899, that the company shall build upon the site therein referred to a new theatre according to plans, elevations, etc., to be approved by the Council, and further, that if the Council shall require such elevations or any of them to be of a different and more elaborate or more costly character, design, or materials, the company shall comply with the Council's requirements on condition that the increased cost, if any, thereby entailed shall be paid by the Council. We have now to report that Mr. A. T. Franklin, of the firm of Messrs. Franklin & Andrews, quantity surveyors, the arbitrator to whom the matter was referred, has awarded that the requirements of the Council did properly entail on the company increased costs, and that the amount of such increased cost is 17,217*l.* This amount, together with the costs (716*l.* 7s.) of the arbitrator in making his award, is, in accordance with the agreement, payable by the Council, and we have therefore forwarded the accounts to the Finance Committee with a view to payment being made. We may add that the company's claim amounted to 28,000*l.*"

Mr. Hunt said the figure was an appalling one, as it was only for the embellishment of the building, so, as it was said, to make it worthy of the site. As regards the architectural features of the theatre, he did not wish to indulge in any comments, beyond saying that he did not regard it as a thing of beauty and a joy for ever, and if nearly 18,000*l.* had been expended on architectural improvements, he failed to discover the point where it could be shown on the building.

Mr. Davies, the Chairman of the Committee, in reply, said the point was that this was not letting land to the Gaiety people whereon to build a theatre, but it was the purchasing of the company's interest in the old theatre and the land on which it stood, and re-instating them in a new site. There was a feeling both inside and outside the Council that the class of property to be erected on this site should be worthy of London. The Council was not in a position to compel these people to put up a building that would be a credit to London, but they had succeeded in doing so by the means reported on by the Committee.

The subject then dropped.

Water Supply to Tenement Houses.—The Public Health Committee brought up a report dealing with the water supply to tenement houses, as follows :—

"On May 10, 1904, we brought to the notice of the Council the report by the medical officer of health as to the result of an inquiry by Dr. Young respecting the sanitary accommodation in houses originally built for one family, but now let in separate tenements to several families. One of the important facts disclosed in that report was the inadequacy of the arrangements for the supply of water to the tenants of the upper floors in such houses: there being in many, if not most, of such houses but a single tap, and that in the basement or on the ground floor. The supply of water to inhabited houses is regulated by the provision of sections 2 and 48 of the Public Health (London) Act, 1891. Section 2 provides that, where there is a constant supply of water, absence from premises of water fittings shall be a nuisance liable to be dealt with summarily under the Act, and section 48 (1) provides that 'an occupied house without a proper and sufficient supply of water shall be a nuisance liable to be dealt with summarily under this Act, and if it is a dwelling-house, shall be deemed unfit for human habitation.' We were doubtful whether these provisions were sufficient to enable sanitary authorities to require a supply of water to the tenants of each floor in tenement houses, and on June 14, 1904, the Council decided to promote legislation on the subject, but its resolution was subsequently rescinded on December 6, 1904, as the Parliamentary Committee reported that they were advised that it was by no means clear that the present law was insufficient to meet the case, and as we were endeavouring to get the matter tested at the instance of one of the metropolitan borough councils. We are now glad to report that on December 16, 1904, as the result of proceedings by the Woolwich Metropolitan Borough Council respecting the water supply of a tenement house, No. 1, High-street, Woolwich, the magistrate decided that the supply of water from a tap in the yard was not a proper and sufficient supply within the meaning of section 48 of the Public Health (London) Act, 1891, and he made an order to abate the nuisance, and ordered the defendant to pay 5*l.* 5s. costs.

Dr. Hamer, the Council's assistant medical officer of health, gave evidence supporting that given by the medical officer of the borough council, and the following extracts from the proof of Dr. Hamer's evidence show the conditions which he found on visiting the premises in question on December 13, 1904—

'The house is a three-story house; a single man occupies the ground floor rooms. A woman and her child occupy the first floor front room; the first floor back is separately let. In the top floor front there are a man and wife and two children (one of the children is, however, not always at home), and in the top floor back there is a single man. The only appliance for supplying water for domestic use to the occupiers of these five sets of tenements is that situated in the back yard of the house. All water for cooking, drinking, personal ablution, washing clothes, and scrubbing floors has to be fetched from the yard; there is no wash-house, and the copper in the yard is in a dilapidated condition.

The tenants of the top floor store water in a pail, which is kept on the landing at the top of the staircase; this staircase is very dark and the pail is uncovered, and water stored in this manner is liable to become polluted.

The conditions as regards cleanliness of the rooms and staircase are unsatisfactory, and this is not surprising, having in view the need of carrying water from the yard all the way upstairs.'

The case is an important one, and we think that the attention of all the metropolitan borough councils should be called to it. We therefore recommend that a letter be addressed to the metropolitan borough councils calling their attention to the decision of the magistrate at the Woolwich police-court on December 16, 1904, to the effect that the supply of water from a tap in the yard is not a proper and sufficient supply within the meaning of section 48 of the Public Health (London) Act, 1891, and expressing the Council's hope that they will take all possible steps to secure the provision of a proper and sufficient supply of water for the tenants of every floor of a tenement house."

The recommendation was agreed to without discussion.

By-laws Under Section 39 (1) *of the Public Health* (*London*) *Act*, 1891.—The same Committee reported that the Local Government Board has confirmed the amended by-laws made by the Council on November 8, 1904, under section 39 (1) of the Public Health (London) Act, 1891, with respect to water-closets, earth-closets, privies, and receptacles for dung. These by-laws include a requirement as to the number of water-closets which must be provided in proportion to the number of inmates of houses let in lodgings or occupied by members of more than one family, and, having regard to the decision of the High Court (King's Bench Division) on December 9, 1903, in the case of Nokes & Nokes *v.* The Mayor, Aldermen, and Councillors of the Metropolitan Borough of Islington, a proviso has been added to the effect that proceedings shall not be taken in respect of failure to provide and maintain the required number of water-closets unless and until the owner of the lodging-house has been served with a notice in writing by the sanitary authority and has not complied with the by-laws in question within the time specified in the notice.

The Council adjourned soon after seven o'clock.

Fifty Years Ago.

INCREASED FACILITIES AT LONDON BRIDGE.—A correspondent, Mr. M. T. O'Keeffe, C.E., suggests the formation of a superway for foot passengers across London Bridge, based on two rows of columns, 15 ft. high and 30 ft. apart, and so distributed as to divide the slow from the quick traffic below, while also supporting the transverse and longitudinal girders on which the superway would be laid, and which could be ascended to by some thirty easy steps. The railway foot traffic, he further suggests, might be provided with a continued superway, leading into or out of the railway terminus. The same suggestion might apply to Waterloo Bridge. So far from being unsightly, our correspondent remarks that it might be made, in the opinion of many, ornamental (as a Rialto), rather than otherwise.—The *Builder*, February 3, 1855.

APPOINTMENT OF SANITARY OFFICERS.—The Local Government Board has sanctioned the appointment of Miss M. M. Pole as an additional sanitary inspector in the City of London, and has also sanctioned the re-appointment of the undermentioned sanitary inspectors in the City of Westminster:—Miss C. W. Byrne, and Mr. A. L. Ware.

Illustrations.

WEST FRONT, BEVERLEY MINSTER.

THE illustration of the west front of this well-known church is from another of the fine drawings made by Mr. J. B. Fulton in the course of his sketching tour as holder of the Royal Academy Studentship in Architecture.

UNIVERSITY COLLEGE SCHOOLS, HAMPSTEAD.

WE give this week a reproduction of the perspective view of Mr. Arnold Mitchell's design for the proposed new University College School at Hampstead, which received the first premium in the recent competition, and is, we presume, to be carried out.

We gave the plans, elevations, and sections, and the architect's description, in our last issue.

SECTION OF S. IRENE, CONSTANTINOPLE.

THIS section of S. Irene, Constantinople, is given as an illustration to our leading article of this week, in which reference is made to it. It is also referred to in the discussion on the papers read at the Architectural Association, and reported in another column.

METROPOLITAN ASYLUMS BOARD OFFICES: PRINCIPAL ENTRANCE.

OUR illustration shows the entrance to these offices. The main entrance-hall is at the corner of the Embankment and Carmelite-street, the entrance-door being flanked by two circular turrets, which in the hall form bay windows.

Immediately through the hall is a marble staircase with a centre flight of steps branching right and left to the first floor, one side leading to the large board-room, the other to the committee-rooms.

The approach from the pavement to the entrance is through a pair of wrought-iron gates forming part of the general enclosure of the site.

The iron work was made by Messrs. Avery, Downey & Co., from designs and full sizes prepared by the architect, Mr. Edwin T. Hall. The stone carving shown on the building was done by Mr. H. C. Fehr.

GATES, WORSLEY HALL.

THESE gates have recently been erected at the new entrance to Worsley Hall, near Manchester, for the Earl of Ellesmere. They have been entirely executed from my design by Messrs. George Wragge, of Salford, Manchester, who also made the gearing by which they are opened from the lodge.

F. FORBES GLENNIE.

OLD LEAD SPOUT HEADS, BOLTON HALL.

THESE spout heads were made and fixed in 1678, for Charles, Marquis of Winchester, the first Duke of Bolton.

On October 15, 1902, Bolton Hall was destroyed by fire, but though somewhat damaged and in a bad state of repair, these heads were found to be re-usable, and were therefore placed by the architect (Mr. C. Hodgson Fowler) in the hands of Mr. J. Alfred Hunt, art leadworker, Hoddesdon, for restoration, and, together with their respective fall pipes, they have been refixed on the rebuilt building.

The coats-of-arms are those of the Marquis of Winchester and those of the Marchioness, who was a daughter of the last Lord Scrope of Bolton, and the combined arms of the two families.

The photographs were specially taken for the owner, Lord Bolton, by the clerk of works, Mr. John Holden, prior to their being refixed.

INTERNATIONAL SOCIETY OF SCULPTORS, PAINTERS, AND GRAVERS.—Owing to the amount of work entailed in arranging the Whistler Memorial Exhibition, the Council of the International Society of Sculptors, Painters, and Gravers has decided to close their exhibition, now open in the New Gallery, on Saturday evening, February 11. The exhibition of the works of Whistler opens to the public on February 22.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses :—

Lines of Frontage and Projections.

Hammersmith.—A block of residential flats adjoining (eastward) No. 30, Goldhawk-road, Hammersmith (Messrs. Leslie & Co., Ltd.).—Consent.

Hampstead.†—Six buildings upon a site abutting upon the south-western side of Finchley-road and northern side of Lymington-road, Hampstead (Mr. W. F. Cave).—Consent.

Lewisham.—A library building on a site abutting upon the east side of Brockley-road, and south side of Darfield-road, Lewisham (Mr. A. L. Guy for the Libraries Committee of the Council of the Metropolitan Borough of Lewisham).—Consent.

Kensington, South.†—Stone entrance steps and an iron and glass covered way at No. 81, Holland-park, Kensington, to abut upon Holland Park-avenue (Messrs. Rawlings Brothers, Ltd., for the executors of F. Radford).—Refused.

Wandsworth.†—Buildings, with one-story shops in front, upon the site of Nos. 207, 209, and 213, Balham High-road, Wandsworth (Mr. E. Schneider for Messrs. W. Wallis, J. A. Mullins, and F. J. Pettit).—Refused.

Width of Way and Line of Frontage.

Kensington, South.—The retention of a concrete platform on the east side of Malvern House, No. 29, Holland Park-avenue, Kensington, at less than the prescribed distance from the centre of the roadway of Aubrey-road (Mr. C. W. Boswell for Mr. G. Pidduck).—Consent.

Width of Way, Line of Frontage, and Space at Rear.

Bow and Bromley.—A one-story building at the rear of No. 21, Devons-road, Bromley, to abut upon Bruce-road (Mr. G. Lewis for Dr. B. Hogan).—Consent.

Line of Frontage and Construction.

Finsbury, Central.†—Three iron gangways to connect at the first, second, and third floor levels Nos. 67, 68, and 69, Turnmill-street, and No. 3, Printers-buildings, Broad-yard, Finsbury (Mr. R. A. Jack for Messrs. R. S. Murray & Co.).—Consent.

Fulham.—A shed at the side of No. 59, Langthorne-street, Fulham, to abut upon Woodlawn-road (Mr. T. Cooper for Mr. Hedges).—Refused.

Space at Rear.

Kensington, South.—A modification of the provisions of section 41, so far as relates to the proposed erection of buildings upon a site abutting upon the east side of Hornton-street and south side of Holland-street, Kensington (Messrs. Chesterton & Sons for Mr. W. A. Daw).—Consent.

Means of Escape from the Top of High Buildings.

Westminster.—Means of escape in case of fire, proposed to be provided in pursuance of section 63 of the Act, from portions of the stories, the upper surfaces of the floors of which are above 60 ft. from the street level, of a building abutting upon Millbank-street, Wood-street, Great College-street, and Little College-street, Westminster, for the persons dwelling or employed therein (Mr. W. D. Caröe).—Consent.

Finsbury, East.—Means of escape in case of fire, provided in pursuance of section 63 of the Act, on the fifth (topmost) story of Nos. 2 to 14, Clarence-street, St. Luke, the upper surface of the floor of which is above 60 ft. from the street level, for the persons dwelling or employed therein (Messrs. Salmon & Gluckstein, Ltd.).—Consent.

Deviation from Certified Plans.

Strand.—Deviations from the plan certified by the District Surveyor, under section 43 of the Act, so far as relates to the proposed rebuilding of Nos. 30 and 31, Duke-street, Piccadilly, with projecting balconies at the second floor level (Messrs. Gordon & Gunton for Mr. F. Runchman).—Consent.

Stepney.—Deviations from the plan certified by the District Surveyor, under section 43 of the Act, so far as relates to the proposed rebuilding of No. 152, Commercial-road, and Nos. 2 and 4, Hessel-street, Whitechapel (Mr. F. K. Abrahamson).—Consent.

Formation of Streets, etc.

Kensington, North.—That an order be issued to Messrs. Trant, Brown, & Humphreys, sanctioning the formation or laying out of new streets for carriage traffic upon the St. Quintin estate to lead out of St. Quintin-avenue, High Lever-road, and Latimer-road, Kensington (Mr. W. H. St. Quintin).—Consent.

Camberwell, North.—That an order be issued to Mr. T. Wilson refusing to sanction the formation or laying out of a new street, for foot traffic only, in continuation of the portion, leading northward, of Elmington-road, Camberwell, and in connexion therewith the erection of three houses (Mr. J. Vanden Bergh).—Refused.

Islington, North.—That an order be issued to Mr. C. W. Callcott refusing to sanction the formation or laying out of a new street for foot traffic only to be used as a covered market, out of the south-west side of High-gate-hill, Islington (for Mr. J. W. Galton).—Refused.

Hackney, Central.—That an order be issued to Mr. C. Winkley refusing to sanction the erection of buildings on sites abutting upon the east and west sides of Priory-pace, Well-street, Hackney, and the widening of a portion of Priory-place.—Refused.

Cubical Extent and Construction.

Rotherhithe.—Three iron lift enclosures, and an iron gangway, and an alteration to an existing gangway at premises on the northern side of Jacob-street, Mill-street, Bermondsey (Mr. W. T. Walker for Messrs. Spillers & Baker).—Consent.

Buildings for the Supply of Electricity.

Hammersmith.—A steel structure supporting the thermal storage tanks and coal bunkers, and the roofs thereto at the generating station, Fulham Palace-road, Hammersmith (Mr. H. Mair for Hammersmith Borough Council).—Consent.

The recommendations marked † are contrary to the views of the local authority.

ARCHITECTURAL SOCIETIES.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—On Thursday, the 26th ult., Mr. Thos. H. Mawson read a paper on "The Principles and Practice of Garden Making," Mr. G. B. Bulmer, President, in the chair. The lecturer said "that, although I have no wish to pose as an architect, yet I am deeply interested in all subjects that appertain to the house and garden, and also in the furnishing of the home. Candidly speaking, we all know how impossible it is for an architect to master technically the vast range of ever-increasing subjects that crowd into an ordinary town practice, and I find the same in my own sub-division of the profession, if I may so call it. Most part of our small gardens seem to lack just the one touch of regularity which is in accord with the house—in most cases a compact low hedge or a breadth of grass—touches which an architect should be able, from the nature of his training, to impart; for, when once the gardener is started upon right lines, he can maintain it, but the ambitions of the modern gardener are too much centred upon, and too much measured by, his abilities to compete in the flower-show exhibitions. After having enunciated guiding principles, I desire to lay special stress upon one very important branch of the subject of laying-out grounds—viz., the trees and plantations, the most important essential in imparting character and local colour to the environment of a home. At no time, if the scheme is to be successful, can we divorce the house and, in the strict force of the word, the gardens from the surroundings; all must be viewed together in unity. When there is perfect freedom of choice, the three great considerations in deciding upon the site and position of the house are:—Climatic conditions—that is, whether the pervading character of the air is humid or dry; the nature of the subsoil, whether sandy, gravelly, or clay; and the aspect, for, no matter what the prospects offer, it is unwise to build upon the north, north-west, or north-east side of a hill or knoll. The nature of the subsoil is a point which needs more than ordinary caution. Beds of clay, though perhaps not so unhealthy, are cold and disagreeable, and difficult to drain by the natural process of filtration. For healthy beauty, luxuriance, and ultimate cheapness, select a site with an understratum of gravel or marl and a good surface covering of loam. With regard to surface soil for a flower-bed, it is a good plan to lay at a depth of about 2 ft. a layer of broken bricks, then to overlay this with a covering of ashes, and then about 21 in. of soil of desirable lightness. For trees and shrubs, a depth of 1 ft. 6 in. or 2 ft., with a plentiful admixture of fibrous turf loam. Grass also requires a depth of soil not less than 8 in., with a well-drained bottom properly prepared." With the intent of showing the successive stages of the development of a scheme and the way it gradually assumes shape, the lecturer showed on the screen three schemes with plans and photographs. In each case the lecturer was the designer of the gardens, but there was a free exchange of ideas and criticisms between the architect, client, and the lecturer. The first scheme was in Ashdown Forest, the second on Berkhamstead Common, and the third in Devonshire.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—A meeting of this Society was held on the 26th ult. in the Society's room, Leopold-street, Sheffield, when Mr. T. Winder presided, and a lecture was given by Mr. H. L. Paterson, A.R.I.B.A., on the "Geometrical Period" of Gothic Architecture. He began by pointing out that the fusion of the Saxons and Normans into one people and the gradual separation of England from France allowed each nation to pursue its own ideals, and the architecture of each to assume a national character. It was in ecclesiastical architecture that the greatest development took place, the monasteries being the only place in which men could be trained, and in which the large stores of wealth gave them the opportunity of exercising the artistic faculties by erecting noble buildings. By the beginning of the XIIIth century the style known as Gothic was firmly established throughout Western Europe. This style, in which the greatest constructive skill was required, and in which the principle of elasticity was fully and consistently developed, contrasted with the architecture of the Greeks, in which dead height was the most marked characteristic. The practice of concentrating the thrust of a vaulted roof on large masses of masonry, the thrust being often carried across intervening space by flying buttresses, allowed the intervening wall to be largely dispensed with so far as any constructive purpose was concerned, and left it free to be utilised to the full for windows. These became larger and more elaborate, and the increasing use of coloured glass hastened the process. Tracery, the progress of which is the most characteristic feature of the geometrical period, had its germ in Romanesque and Byzantine times, and during the Norman and Lancet period which followed the evident desire to decorate the plain stone spandrils, as well as the desire for more light, led step by step to the piercing of the stonework. This took first the form of pierced plates, the stonework being reduced until it took the form of bars or mullions, until the common use of foliation or cusping and completely developed tracery was brought in. The lecturer showed some of the steps by which this development took place in vertical windows, and also in rose windows, and how eventually a traceried window included both types. The different kinds of cusping were noted, and also the change from a purely geometrical treatment to one in which intersecting bars and a combination of the two kinds led to the culmination of the style. Slides were shown also to call attention to the change which took place in the mouldings, and also in the ornament during this period, and the lecturer concluded by calling attention by means of slides to some of the differences between English and Continental work.—On the motion of Mr. W. G. Buck, seconded by Mr. W. Potts, and supported by Mr. H. Wilson, Dr. Wilkinson, Messrs. W. J. Hale, J. R. Wigfull, and E. M. Gibbs, a vote of thanks was accorded the lecturer. The lecture was illustrated by lantern slides exhibited by Mr. J. Atkinson, of University College.

WOLVERHAMPTON ARCHITECTURAL ASSOCIATION.—The annual meeting of the Wolverhampton and District Architectural Association was held on Thursday, the 25th ult., at the Law Library, Lich Gates, Wolverhampton, when the following officers were elected for the year 1905:—Mr. Fred T. Beck, President; Mr. W. Edwards, vice-president; Messrs. S. H. Eachus (London), T. H. Fleeming, and J. Lavender, members of council; Mr. J. Harrison Weller, hon. treasurer; Mr. A. Eaton Painter, hon. auditor; and Mr. W. J. Oliver, Darlington-street, Wolverhampton, hon. sec. At the conclusion of the business of the meeting the President delivered his annual address to the members. In the course of the address the President dealt at some length with the objections to the employment of official architects and surveyors to carry out work for municipalities which ought rather to be placed in the hands of architects who are in general practice. We are most strongly of the same opinion; official architecture, unless in some exceptional cases where

a municipality has succeeded in engaging a man of architectural genius as an official (which does not often happen), almost always tends to become commonplace and mechanical in character; moreover, it is a hardship to outside architects that men who are in the enjoyment of fixed positions and salaries should be, as it were, taking their work from them. At the came time we cannot but feel that it is a delicate subject for architects and architectural societies to handle. The general propositions with which Mr. Beck summed up his remarks, however, are perfectly reasonable, and such as ought to have the support of the public. They were as follows: First, that all works of a monumental character or national importance should be open for competition to all architects in the Kingdom on fair and reasonable terms and conditions; second, that works under the jurisdiction of the county authority be either competed for by those practising within the county, or generally divided as occasion arises among them; third, that works under municipalities be given out in a similar manner among architects practising in such municipality; fourth, all salaried officials shall confine their attention to work for which they are specially trained, and in no case to the carrying out of new buildings or extensions to existing buildings, but only to such alterations as may not involve enlargement, and in the case of borough engineers to street and drainage works pure and simple, including of course advising the council on plans submitted for their approval. Also that a limit shall be placed on the number of their staff, according to the size and importance of the municipality where engaged; fifth, in all cases where professional men are engaged the usual terms of payment shall be observable in all respects, whether it be necessary for them to work in conjunction with the salaried official or not; sixth, salaried officials to be allowed the privilege of taking pupils, under certain restrictions and limitations.

NORTHERN ARCHITECTURAL ASSOCIATION.—A meeting of the Northern Architectural Association was held on the 31st ult. at the Y.M.C.A. Buildings, Newcastle. Mr. J. W. Taylor, President, was in the chair. Mr. Frank Caws, of Sunderland, presented his award in the essay competition on the subject of "Characteristics of XIIIth Century Architecture, with Special Reference to Moulding and Ornament." The first prize was given to Mr. H. L. Hicks, of Gosforth, and the second to Mr. W. Stockdale, of North Shields. Mr. J. Eadie Reid then delivered a lecture on "Designing for Mosaics and Stained Glass." He said there was only one way of designing, and that was through the narrow portals of invention. The designer must be able not only to see the subject as it presented itself to his mind's eye, but, by some curious subtle process, he must have the power of making the actors in the subject adapt themselves to the space to be decorated. There should be ease, simplicity, and directness. He urged that they should study drawing, and observe always. It was necessary to cultivate the art of drawing from memory. If there was a difficult bit they should analyse it and keep at it until they had thoroughly mastered every detail. The Japanese artist sat the whole day looking and studying, without touching either pencil or paper. There was no law; the method of one designer was not the method of another. It was just possible to draw too much and look too little. He urged the necessity of a knowledge of the material one was designing for, and commended a study of the pre-Raphaelites, with their simplicity. A study of the great master's works would enable the artist to avoid the dangers which would otherwise assail him; he would learn to avoid the staginess of the later men, and to appreciate the quiet dignity of the earlier. Passing from the conception to the execution, Mr. Reid spoke of the need for drawing from the life and from drapery. Colour should be the goal of the glass-painter; light and shade were out of place. Mosaic presented difficulties which were purely technical; and the designer should work in faith, with a clear perception of the end, aiming at something more than he could do. The best effects, he said, were gained by simple means. All movements must be slow and monumental; there must be no hurry. To be able to design one must be able to draw, and the only way to perfect one's drawing was to keep on drawing. At the same time, the designer required not merely a superficial knowledge of the material he was designing for; he should endeavour to obtain a practical knowledge. A study of the old masters was not everything. If the artist had got the sense of design, there was no reason why he should not imitate, no matter how skilfully, the work of past ages. The mission of the artist was to see the things around him, and to render with all the knowledge and skill that were given him the imaginings of his brain.—On the motion of Mr. Joseph Oswald, a cordial vote of thanks was given to Mr. Reid.

COMPETITIONS.

THREE PUBLIC LIBRARIES, BELFAST.—The architects for the three Public Libraries at Belfast are Messrs. Græme-Watt & Tulloch, 77A, Victoria-street, Belfast.

BOOKS RECEIVED.

THE EIGHTEENTH CENTURY ARCHITECTURE OF BATH. By Mowbray A. Green, A.R.I.B.A. (Bath: G. Gregory.)

LAXTON'S PRICE-BOOK FOR ARCHITECTS, BUILDERS, ENGINEERS, AND CONTRACTORS, 1905. (Kelly's Directories, Ltd.; and Simpkin Marshall & Co. 4s.)

LIVES OF THE ENGINEERS. By Samuel Smiles. Popular edition. Metcalfe—Telford. (John Murray. 3s. 6d.)

NATIONAL ENGINEERING AND TRADE LECTURES. Edited by Ben. H. Morgan. Vol. I. (Archibald Constable & Co.)

THE YEAR'S ART, 1905. Compiled by A. C. R. Carter. (Hutchinson & Co.)

CALCAREOUS CEMENTS: THEIR NATURE, MANUFACTURE AND USES. By Gilbert R. Redgrave and Charles Spackman. Second and revised edition. (Charles Griffin & Co.)

Correspondence.

REGISTRATION AND THE STATUS OF ARCHITECTS.

SIR,—The Royal Institute's inquiry into the custom of other countries as to the status of our profession is interesting.

Russia figures as the chief of the three States where the profession is a close one. The wonderful influence that the proposed change is to have on the social status of architects is touched by a curious sidelight from no less a person than Tolstoy, whose observation is close enough in such matters. Describing a dinner party at a country house in Russia, in his novel "Anna Karenina," he tells us that "All wore evening dress *except the architect*."

GEORGE REAVELL, JUN.

WESTMINSTER CITY COUNCIL.

THE first meeting of this Council after the adjournment was held on Thursday last week at the City Hall, Charing Cross-road, the Mayor, Lord Cheyelesmore, presiding.

The China Trophy Gun.—The General Purposes Committee reported that, in reply to the Council's communication for a carriage to be supplied with the Chinese Trophy Gun allotted to the Council, they had received a letter from the Secretary of the War Office stating that a carriage did not form part of the trophy, as none was captured with the gun, and that the regulations did not admit of the expenditure of public funds in the alteration of a carriage for the purpose, but that, if desired, the obsolete carriage selected by Colonel Hobart could be supplied free of charge, leaving it to the Council to arrange for the necessary alterations and repairs. The Committee recommended that the offer of the military authorities should be accepted, and that the gun be placed in the Horseferry-road Gardens, instead of on the triangular refuge opposite the City Hall. The recommendations were agreed to without discussion.

The Unemployed and Paving Works.—A lengthy discussion took place on a report by the Works Committee on the question of the employment of some of the unemployed in laying wood paving in Grosvenor-square, and on other paving works. Considering the time of year unsuitable for the work, and also that the work was not of a nature which would be suitable for giving work to the unemployed, the Committee recommended "That no action be taken." Ultimately this was agreed to.

The Lifts at Piccadilly-circus Electric Railway Station.—It was reported that a letter had been received from the Railway Company stating that they were endeavouring to obtain a widening of the footway where these lifts discharge into the street.

Extensions at Covent Garden Market.—Amended proposals with regard to the new frontage lines, railings, areas, etc., at the corner of Wellington-street and Russell-street were approved. The three projecting piers to the railings on the Wellington-street frontage will be made flush with the line of railings, and the proposed step-ladders to the basement on the Russell-street frontage will be made single instead of double, allowing the whole line of boundary fence to be set back to the existing frontage of No. 8, Russell-street.

Bills in Parliament.—It was resolved to lodge petitions against a number of Bills which will come before Parliament in the ensuing session, among those to be opposed being the Baker-street and Waterloo Railway Bill, Charing Cross, Euston, and Hampstead Railway Bill, Central London Railway (New Lines) Bill, Great Northern, Piccadilly, and Brompton Railway Bills (Nos. 1 and 2), Hammersmith, City, and North-East London Railway Bill, the London County Council Tramways Bill, the Omnibus Bill (General Powers) of the London County Council, London Port and Docks Commission Bill, the London Squares and Enclosures Bill, and several of the London Electric Lighting Bills. In many cases clauses to protect the City Council were all that was asked for.

The Student's Column.

TYPICAL STRUCTURES IN CONCRETE STEEL.—V.

A SIXTEEN-STORY OFFICE BUILDING (*Concluded*).

THE moulds for the concrete work were all made on the site of the building, the timber being cut as required by a motor-driven saw-bench moved up from floor to floor as the work progressed. The boards were planed on one face only, to reduce them to the required thickness, the other face being left as it came from the saw so as to give a rough surface to the concrete, with the object of providing a tooth for the plastering.

The column moulds were strongly built to resist hydrostatic pressure, the sides being formed of vertical boards joined together by being nailed to horizontal battens. The sides of the moulds were held firmly in position by means of horizontal frames built outside them, as will be seen by Fig. 27. Each frame consisted of two stout pieces, of timber, placed one on each side of the mould, and connected by bolts passing horizontally through the projecting ends, distance pieces being fixed on the two other sides parallel with the bolts so as to form a rectangular frame. A sufficient number of such frames having been provided for each mould, the whole construction was tightly keyed up by driving timber wedges between the frames and the sides of the moulds.

The arrangement differs in point of detail from that illustrated in Fig. 3, p. 20, but is equivalent so far as concerns its practical effect. In one respect, however, it is far more convenient, as the frame can be very easily removed simply by unscrewing the nuts of the two bolts; then the side boards of the mould come apart quite readily.

After careful adjustment, the moulds were secured in position by diagonal braces of timber between each of the four sides and the under surface of the girder moulds.

The moulds for the girders (Fig. 28) were of simple construction, consisting of bottom and side boards clamped together, the upper edges of the vertical boards being fixed by nails passing through the planks used for the formation of the floor slabs. In order to avoid sharp angles at junctions of the girders and floor slabs, the girders were chamfered outwards at the top, as indicated in the drawing, so as to form a triangular fillet below the floor slabs at the point of junction.

The clamps employed for holding together the boards at the bottom consisted of a round rod forged at one end into the form of a hook and provided at the other end with a washer shaped so that when driven to a certain position it would hold the bolt by friction. To tighten the clamp the hooked end is held against the side board of the mould and the washer is then driven forward to the position shown in Fig. 28. To release the clamp, it is only necessary to strike a smart blow at the lower part of the washer.

The girder moulds were carried on timber joists attached to the column moulds and supported by intermediate struts where necessary.

About ten days were occupied in erecting the moulds for each story and two days in depositing the concrete, the quantity being about 120 cub. yds.

Fig. 29 is a vertical section showing part of a mould for the front wall of the building, between the window openings of two stories. The projecting part of the mould on the left side of the drawing is for the formation of one of the projecting ribs (mentioned in Article III., p. 64) by which the marble facing blocks are secured to the concrete. On the other side of the drawing is shown part of the floor centring, the opening above this providing for the junction of the concrete in the floor slab and the wall. All the wall moulds for parts of the building containing window openings were built up of boards placed horizontally and joined together by outside vertical cleats spaced about 3 ft. apart, and the lower panels were braced outside by timber struts notched into the projecting ends of timbers extending from the girder moulds and scotched below horizontal cleats nailed to the outside of the wall moulds.

The wall moulds were supported by shores and bracing to enable them to hold up the semi-fluid concrete, and in the case of moulds next to the party walls, the brickwork of the adjoining buildings was utilised, as far as its height permitted, to form the outer side of each mould.

Three sets of moulds were erected at the commencement of work upon the superstructure, and, as soon as the bottom story was completed and the concrete had sufficiently hardened, the corresponding set of moulds was taken down and re-erected for the concreting of the story above the top set of moulds. This process was repeated until the entire building was completed. The moulds were kept in position for about fourteen days after the concrete had set, and after their removal from the main girders intermediate support was given to these members by means of vertical struts for a further period of about thirty days, so as to permit the concrete to attain sufficient strength before being subjected to the entire load of the floor system. The adoption of this mode of procedure enabled the contractors to complete from two and a half to three stories per month.

For the convenience of the men engaged in building the wall moulds, in ramming the concrete, and in tapping the outside of the moulds to assist the concrete to fill all spaces, a temporary balcony was constructed round the building at each story, these balconies being supported by projecting beams anchored down inside the building and supported at the free end by diagonal struts bearing against the outer wall. Tarpaulin sheeting was hung below the balcony to catch any drippings from the wet concrete, and thus to protect the marble facing and the men working below.

By building the columns first and following on with the walls, main girders, joists, and floor slabs, the entire weight of the structure was carried by the columns, and, with the exception of the exterior balconies and a few struts, no falseworks were required for the construction of the main features of the building. It may be stated, however, that scaffolding was used by the plasterers and other mechanics in finishing the interior details of the structure.

In building the floors the reinforcement was first laid, wired in position, and supported on cross rods so as to leave about ⅜ in. clearance between the bars and the bottom of the mould. When the concreting had once been commenced, it was continued until the completion of the entire floor, to avoid any break of continuity. After being dumped, the concrete was rammed and the surface dressed smooth and true by straight-edge and level. The girder moulds were filled at the same time as the floor moulds.

Metal sleeves and boxes in the walls and floors for pipes and electric wires were placed in predetermined positions as the work proceeded so as to obviate cutting away. To keep out the

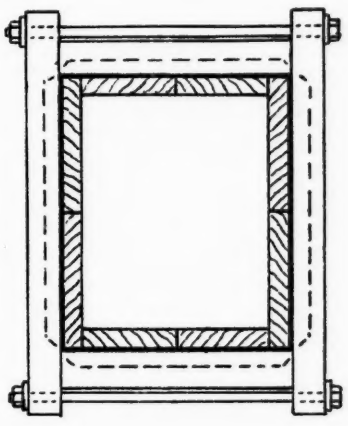


FIG. 27.

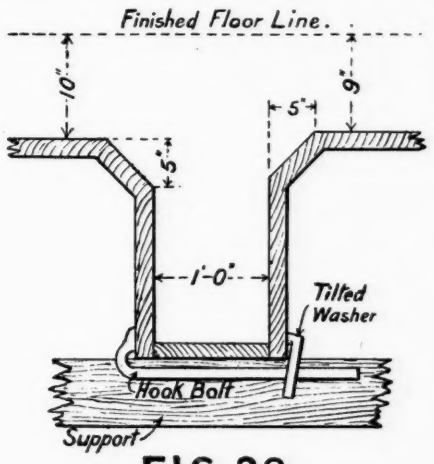


FIG. 28.

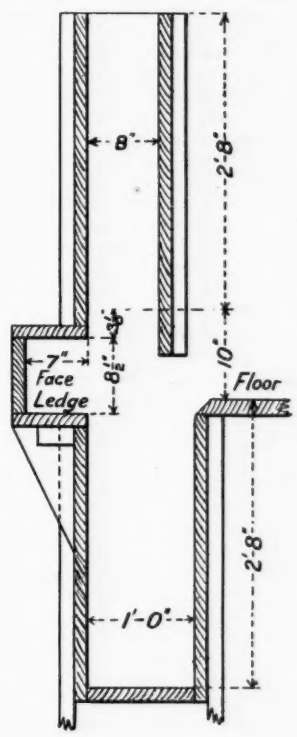


FIG. 29.

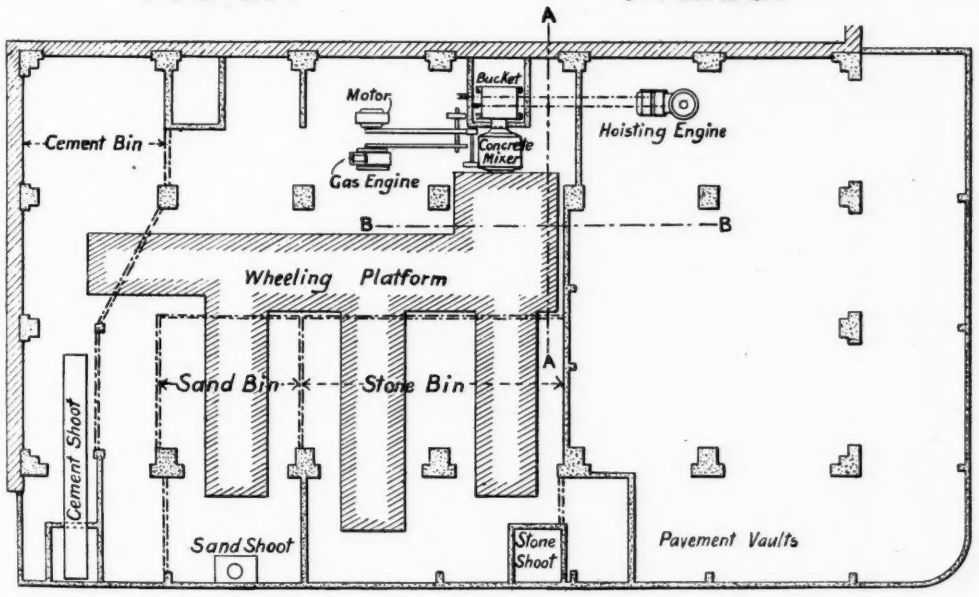


FIG. 30.

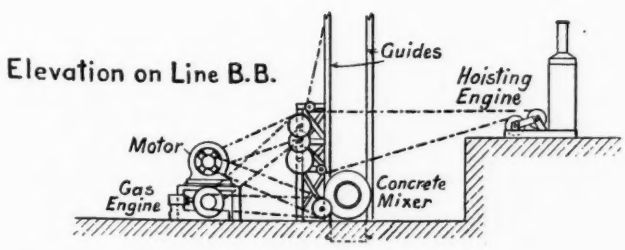


FIG. 31.

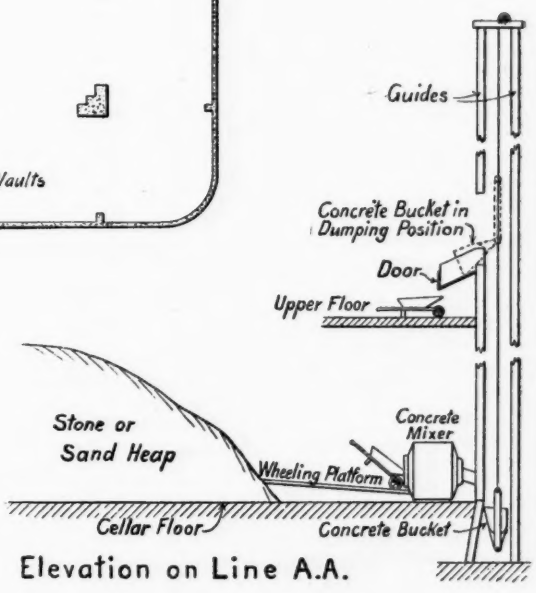


FIG. 32.

Illustrations to Student's Column.

concrete, the sleeves were filled with sand, which was afterwards removed.

One of the most noteworthy features in connexion with the construction of this building was the avoidance of undue interference with street traffic, such as occurs when large steel columns and girders have to be delivered upon the site of a steel frame building. It may be mentioned further that the large derricks and other heavy hoisting machinery usually employed in modern building operations were not required, the hoisting apparatus being limited to a light derrick for unloading the steel reinforcement, three or four movable frames for fixing the marble slabs of the lower stories, and an internal hoist for conveying concrete and timber from the basement to the upper stories of the building.

Full advantage was taken of the basement for the storage of materials, and, as soon as the excavation had been completed, three large storerooms (see Fig. 30) were built on the floor for cement, sand, and stone. These were filled from carts or vans by shoots, the positions of which are indicated in Fig. 30, which is a plan of the basement. As the storerooms contained enough material for the building of two complete stories, the contractors were fairly secured against the possibility of delays arising from the non-delivery of material at the times expected. A platform was constructed so as to facilitate the wheeling of materials from the storerooms to the concrete-mixing machine, and, to reduce labour, these platforms sloped downwards towards the mixer (Fig. 32). At one side of the basement, a complete concrete plant was laid down, consisting of a concrete mixer, a concrete hoist, a steam engine and boiler, a gas engine, an electric motor, and the necessary mill gearing (see Figs. 30, 31, and 32).

The concrete mixer was of the revolving drum type, running at ten revolutions per minute, and so arranged that the materials, brought from the storerooms in barrows of known capacity, could be tipped directly into the drum and the mixed concrete afterwards discharged into the bucket of the adjoining hoist without interrupting the revolution of the machine. By this arrangement very little time was lost between the completion of one batch and the commencement of the next. The mixer held about 18 cub. ft. of concrete, but, as it was not usually possible to utilise the machine to its full capacity, the average output was not more than about 10 cub. yds. an hour. As a general rule, the mixer was driven by belting from the electric motor, but, to guard against delay owing to temporary breakdown of the motor, provision was made for running it from the gas engine (see Fig. 31).

The concrete hoist, also available for raising timber, was extended to the upper floors as the building progressed. The hoisting bucket was of special design, being constructed of steel, pivoted eccentrically at the bottom and provided with a spout which could be inserted below the outlet of the concrete mixer so as to receive its contents when desired. When the bucket had been hoisted to any floor above it could be tilted so as to discharge concrete into a shoot, provided at the bottom with a simple form of gate valve, whence the concrete was poured out into barrows and wheeled to the required points (see Fig. 32). Under ordinary circumstances, the hoist was driven by belting from the steam engine, but pulleys and belting were also provided so that it could be operated by the electric motor or the gas engine. Fig. 31 is a diagram showing the alternative methods of driving the mixer and the hoist.

The type of barrow used on the upper floors had two wheels, and was designed so that the concrete could be discharged over the front end the barrow being wheeled over tracks laid above the tops of the moulds. The concrete mixer, hoist, and barrows were designed and supplied by the Ransome Concrete Manufacturing Company.

For dealing with the concrete, a staff of twenty-eight men was engaged, made up as follows:—

Wheeling cement, sand, and stone	9
Attending to mixer and hoist	1
Attending to hoist on upper floor	2
Wheeling concrete on upper floor	4
Depositing and ramming concrete on upper floor	12
Total	28

Including carpenters and other mechanics, the total number employed on the building was about sixty men.

Partitions dividing up the different stories into offices and other rooms were built of hollow "Mackolite" blocks, and the ceiling cornices were formed by metal strips, wire netting, and plaster. Apart from doors, windows, and similar interior fittings, these are practically the only portions of the building not constructed of concrete steel.

Messrs. Eizner & Anderson, of Cincinnati, were the architects of the Ingalls Building, and to them is due the credit for the erection of this monolithic concrete-steel structure. The general design and the detail drawings were prepared by the architects, and the details of the concrete construction—which exemplifies the Ransome system—by the chief engineer of the Ferro-Concrete Construction Company.

GENERAL BUILDING NEWS.

CHURCH, KIRKBY WOODHOUSE.—To replace the present Church of St. John, which was erected as a chapel-of-ease to the mother church of Old Kirkby, in 1860, a new church is to be built at Kirkby Woodhouse, at a cost of 10,000*l*., with school and institute, and on Saturday last the Duke of Portland laid the foundation-stone. The building will consist of a nave, 77 ft. long and 24 ft. wide internally, divided in five bays, with arcades and aisles, the aisles being merely passages 3 ft. 6 in. wide; a chancel, 33 ft. long and 20 ft. wide, with an apsidal east end; a tower and spire, the lower part of the tower giving space for the organ, and the upper portion of the tower and spire (to be built at a later date) providing accommodation for the bells; and choir and clergy vestries. The building is designed in the Early English style, with plain lancet windows. The church will accommodate about 400 people. The builder is Mr. William Smith, of Newark, Mr. D. Davies is the clerk of works, and the architect is Mr. Louis Ambler, of London.

METHODIST CHURCH, SNEINTON.—The New Sneinton Methodist Free Church has been erected from plans prepared by Mr. William H. Higginbottom, architect, Nottingham, seating accommodation being allowed for 450 persons. The contract was let to Mr. John Lewin, of Netherfield. The building is situated on a site at the corner of Sneinton-boulevard and Thurgarton-street, and is of red pressed bricks, with stone dressings. The main front entrance is approached from a gateway at the junction of the boulevard and Thurgarton-street; additional exits and entrances are provided from the boulevard and Thurgarton-street. Internally the walls have a wood dado, and above this the walls are plastered. The seats (chairs) are arranged in three blocks with two aisles; there are also two transepts. The choir is at the back of the pulpit, which is of oak. Underneath the chapel is the schoolroom and five classrooms; separate entrances are provided—the boys' from the boulevard and the girls' from Thurgarton-street. The buildings, exclusive of the site, have cost 4,000*l*. Messrs. Thos. Danks & Co. have carried out the heating; the plumbing and sanitary work is by Messrs. Humphrey & Co.; and the painting and decorating by Mr. A. E. Shipley.

WESLEYAN CHURCH, WOKING.—The new church at Woking is situated in Commercial-road, and is a red brick structure with white stone facings. The spire rises to a height of over 100 ft. from the ground. The nave, transepts, and choir provide accommodation for nearly 500 persons, while another 150 can be seated in the gallery, erected over the vestibule and a small portion of the church. Attached to the church are vestries for the minister and choir, and a church parlour. The school premises, which are not yet completed, form a detached block at the rear of the site, and have corridor communication with the church. They comprise an assembly hall, 54 ft. by 33 ft., a lecture-room, and six classrooms, besides kitchen and lavatory accommodation. The designs of Messrs. W. J. Morley & Son, of Bradford, have been carried out by Messrs. W. J. Drowley & Co., of Woking, whose contract amounted to 7,054*l*.

CHURCH RENOVATION AND NEW SCHOOLROOM, LITTON. — The foundation-stones for the enlargement of the old Wesleyan chapel, at Litton, and also for the erection of a new schoolroom, were laid recently. The work is being carried out, under the supervision of Mr. Joseph Smith, architect, Sheffield, by Mr. Robert Brightmore, mason, and Mr. Richard Lomas, joiner, both of Tudeswell.

SCHOOL, BRISTOL.—The new Council school that is in process of erection at Air Balloon Hill—between the main road to Hanham and the main road to Kingswood—will be opened in about two or three months' time. The school will consist of three departments—boys', girls', and infants'—each department to provide accommodation for 350 children. The buildings will also include a cookery centre, a manual-instruction centre, and a caretaker's house. The architects of the buildings are Messrs. La Trobe & Weston, Bristol; the general contractors, Messrs. Clark & Son, Fishponds; and the heating apparatus will be provided by Messrs. Dark Brothers.

SUNDAY SCHOOL, HEXHAM.—The new Sunday school that has been erected at Shaftoe Leazes at the west end of Hexham by the United Methodist Free Church was opened on the 26th ult. A new chapel is to be built adjoining it, but in the meantime the new school will be used for the services of the church. The new school, which is provided with classrooms and a kitchen, together with the site, has cost something like 2,300*l*. Mr. T. E. Davidson, of Newcastle, was the architect, the work of erection being entrusted to Mr. T. Dorin, builder, Hexham.

MISSION-ROOM, LOW TEAMS.—The foundation-stone of St. Martin's Mission-room, Lumsden-street, Low Teams, was laid recently. Mr. F. W. Purser is the architect, and Mr. William Hall, of Bensham, the contractor.

MISSION BUILDINGS, ISLINGTON.—The new Mission premises which have been erected for St. Peter's Parish, Islington, were opened on the 25th ult. The building consists of ground, first, and second floors. On the ground floor is the main room, with sitting accommodation for about 150 persons. Clubrooms and classrooms and caretaker's apartments are provided on the two upper floors. The total cost was 2,800*l*. Messrs. James & Laycock are the architects.

COUNCIL CHAMBER, WHICKHAM, DURHAM.—A block of buildings has been erected at Whickham by the Whickham Urban District Council, comprising Council offices, caretaker's apartments, etc. The external walls of the buildings are of Eighton Banks freestone, pitch-faced blockers in courses, while all the dressings are of red freestone from the Closeburn Quarries, Thornhill, Dumfriesshire. The main entrance is in the centre of the building, and is approached by a flight of steps leading from the grounds. The entrance leads into the main hall, from which corridors branch off to the several offices on either side. All the offices are on the ground floor. The staircase leads from opposite the main entrance to the first floor, upon which are situate the Council chamber, two committee-rooms, writing-room, and cloakroom. Lavatory accommodation is provided for both floors. The caretaker's quarters are situate at the eastern end of the buildings. The buildings are lighted by gas throughout and heated by means of open fireplaces, which in the Council chamber and committee-rooms are augmented by gas radiators. The Council chamber is 33 ft. long by 25 ft. 6 in. wide. Access to both committee-rooms may be gained direct from the Council chamber and cloakrooms. The buildings, fittings, etc., have been carried out according to plans, specifications, etc., prepared by and under the supervision of the Council's Surveyor, Mr. J. B. Renton. The contract for the buildings and fittings was entrusted to Messrs. J. W. Turner, of Gateshead.

NEW PAVILION AT CARDIFF INFIRMARY.—A new pavilion for electrical treatment was recently opened at Cardiff Infirmary by Sir W. H. Preece, K.C.B. The new block has been erected on the northern side of the central corridor, in a position convenient to each of the main blocks. A short branch corridor gives access on the left hand to the new photographic department, in which, in addition to ordinary photographs, those obtained by the X-rays of subjects under treatment are dealt with. On the right is a room for sinusoidal baths, and beyond it the dark-room for application of the Röntgen rays. The short corridor conducts into the lamp-room. This department can, however, be entirely closed off from the infirmary when desired, as an independent access to it has been made direct from Newport-road, allowing the patients who must be habitually in attendance over their prescribed periods for treatment to enter and leave without any necessity for communication with the infirmary itself. A light entrance porch has been placed at the north-western angle of the lamproom block, from which a waiting-room and then a dressing-room are entered. This room contains fittings for individual use by patients. Lieut.-Colonel Bruce Vaughan, architect, was chairman of the building committee, and Mr. Edwin Seward the infirmary architect. The general contractors for the work were Messrs. C. Beames & Nephew, the hot water, heating, etc., being executed by Messrs. J. Williams & Sons, and the metal work by Mr. James Gibbon.

CLUB PREMISES, SUTTON-IN-ASHFIELD.—The new premises of the Sutton-in-Ashfield Conservative Club, in Forest-street, were recently opened. The plans for the work were prepared by Mr. F. P. Cook, architect, of Mansfield, and the contractor was Mr. Greenwood.

SANITARY AND ENGINEERING NEWS

ELECTRICAL POWER SCHEME, LONDON.—A syndicate of promoters have framed a private Bill, to be introduced in the course of the next Parliamentary session, whereby they seek to form a new company, with an initial capital of 5,000,000*l.*, for the supply of electrical energy in bulk to distributing agencies, including municipal authorities, from generating stations at Fulham, Silvertown, and Greenwich. The company's designated engineer is Mr. Charles Marz, Engineer to the Newcastle Electric Supply Company, and it is estimated that each of the three stations will eventually be equipped with machinery of 100,000 horse-power. The Bill comprises provisions for limiting the profit dividends to 8 per cent. until the price of power shall have been reduced to below a statutory maximum schedule, which ranges from 1½d. per unit to a slight excess above ¾d. per unit, according to the period over which the supply is extended per week, and for enabling the company to give a direct supply, if the retailer fails to make satisfactory terms with a consumer, with appointment of the Board of Trade as arbitrator between the two parties.

THE SHONE SEWERAGE SYSTEM AT KARACHI.—At the meeting of the Institution of Civil Engineers on the 24th ult. Mr. J. F. Brunton read a paper on the working of the Shone system of sewerage at Karachi (India), in which he said that the efficiency of the system as established there was not as good as it was believed to be, and that it fell off until the work done at the ejectors only represented about 18 per cent. of the indicated horse-power of the engines. The result was that the engines were unable to cope with the work, and this led to the author undertaking a careful inquiry into the efficiency of each component of the installation. From trials made it was found that the preventable loss of power that was taking place was due entirely to leakage in the air-main and its attachments, the most probable source of waste being the automatic air-valve at the ejectors. Endeavours were made to increase the efficiency, with the result that the work done at the ejectors now averages 26 per cent. of the indicated horse-power of the engines, a gain of 8 per cent. It was shown that the maximum possible efficiency of the whole system, assuming that the efficiency up to the ejectors is 0·650, could not exceed 0·364 under existing conditions of working. These figures were derived from the results of daily working, and were believed to show accurately the possibilities of the Shone system of drainage, so far as regards its theoretical and practical efficiency.

DOCK, SOUTH SHIELDS.—A new dock, constructed at Wapping-street, South Shields, for Messrs. Brigham & Cowan, Tyne ship repairers, was opened on the 25th ult. The new dock, which is situated in close proximity to the Direct Ferry Landing, has been under construction for over four years. It has been excavated and built by Mr. H. M. Nowell, of Leeds, to the designs of Mr. John Thompson, civil engineer, Newcastle-on-Tyne. It is capable of accommodating a vessel 400 ft. in length. The dimensions of the dock are 400 ft. long by 72 ft. broad and 30 ft. deep, and it will permit of a steamer being docked or undocked at any state of the tide.

BRITISH STANDARD PIPE FLANGES.—All users of steam pipe and many users of water pipe will welcome the series of "British Standard Tables of Pipe Flanges," issued last week by the Engineering Standards Committee. In settling the diameter of flanges, the committee were obliged to adopt dimensions complying with the requirements of valve makers, but as these agree very closely with the conditions obtaining in the case of cast-iron pipes, the only difficulty was that presented by welded-on flanges. As the strength of joints made with such flanges is materially increased by reducing the diameter, a special table of dimensions has been prepared for application to long pipe lines. Two other tables relate to flanges for pipes subject to steam pressures from 55 lb. to 325 lb. per sq. in. Table I. defines the dimensions of "low-pressure standards" for steam pressures up to 55 lb. and water pressures up to 200 lb. per sq. in. Table II. refers to "intermediate-pressure," "high-pressure," and "extra high-pressure" standards, and an excellent feature is that, in these three, the diameters of flanges, the diameters of the bolt circles, and the numbers of bolts are identical, the only differences being represented by variations in the thickness of the flanges and the diameters of the bolts. In Table III., defining permissible dimensions for welded-on flanges, the flange and bolt circle diameters are the same as those adopted in Table I., but the flange thicknesses and the numbers of bolts are necessarily different. The decision that the number of bolts shall in all cases be a multiple of four constitutes a departure from established practice, but in view of the proportions adopted this does not involve any loss of strength or efficiency.

MISCELLANEOUS.

HOUSING OF THE WORKING CLASSES ACTS, 1890 AND 1903.—At the meeting of the Poplar Borough Council, on Thursday of last week, the Public Health and Housing Committee presented a long report upon the law in respect of the demolition of dwelling-houses after closing orders have been made. After quoting from the Housing of the Working Classes Acts, 1890 and 1903, the Medical Officer comments as follows:—

By section 33 (4) it is apparently optional with the local authority whether they will order the execution of the works necessary to render the dwelling-house fit for human habitation; but it would appear that, unless they do so, they cannot make an order for the demolition of the building. It is a very strange state of the law that a house cannot be pulled down which is not reasonably capable of being made fit for human habitation without the local authority making an order for the execution of the works necessary to render the dwelling-house fit for human habitation. So the house remains up and empty to the cost of the ratepayers. The same remarks, viz., stating the necessary works, &c., must also apply to the London County Council, if they resolve to act in default of the local authority under section 45 (2). This state of the law requires amending, and the attention of the Local Government Board and London County Council should be directed to it . . .

The amendment of the law would seem to be to give local authorities the same power under the Housing Acts in respect of closed houses which remain neglected and dilapidated as the London County Council have under the London Building Act, 1894, section 115. The Committee's report continues as follows:—

"In considering an amendment to the Housing of the Working Classes Acts, the Medical Officer suggests that consideration might also be given to the case of an obstructive dwelling-house which has been closed as unfit for human habitation on account of it being in a state so dangerous or injurious to health. Such dwelling-house should not be allowed to be made fit for human habitation if it be an obstructive building. If the law could be so amended, it no doubt would materially assist matters when representations in respect of areas are being considered, as it would prevent obstructive buildings, which are also unfit for human habitation, being repaired, and more compensation demanded later on."

Communications are to be addressed to the London County Council and the Local Government Board with reference to the matter.

LONDON BUILDING ACTS (AMENDMENT) BILL.—A number of the metropolitan borough councils have referred to committees for consideration and report a circular letter received from the honorary secretary to the District Surveyors' Association enclosing copy of resolutions passed by that body submitting that the London Building Acts (Amendment) Bill, 1905, will be absolutely unworkable from its magnitude and complication, and urging that the only satisfactory course is to embody the amendments in a new Bill to supersede the present Acts, which should only be brought before Parliament after careful consideration by the various authorities and professional societies interested therein. It is further submitted that many of the powers proposed to be taken by the London County Council should be the subject of specific rules to be enacted by Parliament, and administered by the district surveyors.

LONDON BUILDING ACTS (AMENDMENT) BILL, 1905.—The Parliamentary Committee of Stepney Borough Council reported on Monday agreeing with a suggestion of the Works Committee that the Parliamentary agents be instructed to present petitions in opposition to clauses 24, 32, 93, and 156 of the London Building Acts (Amendment) Bill, 1905; also that the Council join with other metropolitan local authorities in opposition to the Bill, and that five delegates be appointed to the conference convened by the Kensington Borough Council in regard to the matter.

CAMBRIDGE UNIVERSITY LIBRARY.—With the concurrence of the Library Syndicate the Cambridge University Association make an appeal for funds on behalf of the improvement and maintenance of the library buildings. Two capital sums are required—21,200*l.* for immediate needs, and 126,700*l.* for a maintenance endowment. The present requirements extend to bookcases and fittings for the rooms recently acquired; alterations and repairs of some of the older rooms, especially by way of precautions against fire; a room for reading and reference purposes; modern appliances for students and the staff; an increase of the permanent staff; and the installation in part, with continuation, of the Acton Library.

BRICK TRADE PARALYSED.—The brickmaking trade is in a very depressed condition, and while all the works at Fletton, near Peterborough, have considerably reduced their output, it is probable some will close down altogether, and the number of men who are now idle will be increased. The price of bricks has fallen from 30s. per 1,000 to 12s., and the brick masters are appealing to the Peterborough Assessment Committee for a reduction of at least a third of their assessments. The slump is attributed to the fact that there is little building going on just now, although an improvement is expected in the spring. One firm alone has 7,000,000 bricks stacked.—*Nottingham Guardian.*

LIVERPOOL CATHEDRAL.—Lord Derby presided at a meeting of the general committee of the Liverpool Cathedral, held on the 30th ult., at the Town Hall, Liverpool. Mr. F. M. Radcliffe, one of the hon. treasurers, presented a statement showing the present financial position of the undertaking. He stated that the contributions and promises to date included seven sums of 10,000*l.* each, one of 5,000*l.*, one of 3,000*l.*, six of 2,000*l.* each, forty-four of 1,000*l.* and upwards, thirty-three of 500*l.* and upwards, and 243 of 100*l.* and upwards, the total being 197,901*l.* The contributions for special purposes amounted to 18,594*l.*, and embraced 10,000*l.* for an organ, 2,020*l.* for a window, 1,120*l.* by the family of the late Mr. W. E. Gladstone for a purpose yet to be ascertained, 626*l.* by the Liverpool Gladstone Memorial Committee, 2,014*l.* for a pulpit, 1,014*l.* for a window, 1,017*l.* for a font, 400*l.* for communion rails, 300*l.* for a window, and 80*l.* for a window. The interest on the investment and bank interest amounted to 8,787*l.*, bringing the grand total to 225,283*l.* The special gifts mentioned were irrespective of others, including one by the Earle and Langton families, which, though not included in the present balance-sheet, had been handed to him since the beginning of the year, while other special gifts were the Ismay window and the Lathom chapel. On the expenditure side they had spent on the building site 19,294*l.*, excavation and foundations 2,500*l.*, and in connexion with the foundation-stone laying ceremony by the King in July last 703*l.* After meeting other expenses, the total sum they had now available for the main building was 146,918*l.*, and as the architect's estimate for this portion of the work was 277,000*l.*, it left 130,000*l.* still to be raised.

LONDON STREET NOISES.—The fifth conference of the Street Noise Abatement Committee was held at 2, Harrington-gardens, South Kensington, on Monday evening, when the following resolution, proposed by Capt. Murray-Cookesley, and seconded by Mr. Felix Moscheles, was adopted:—"That in view of the unsatisfactory character of the existing by-laws respecting street noises, and the unreasonableness of expecting private individuals to put the same into force, the London County Council, the Corporation of the City of London, and the borough councils be requested to appoint noise inspectors, whose duties would be to inquire into, and suppress by legal measures, all unnecessary and objectionable noises in the streets and public thoroughfares of the metropolis."

THE LATE MR. BLASHILL.—As an addition to the obituary notice in our last issue, we learn that Mr. Blashill, when first coming to London, entered the office of Mr. T. E. Knightley, with whom he remained for three years.

THE TANTALUM LAMP.—The new glow lamp which is being manufactured by Messrs. Siemens & Halske, of Berlin, was fully described in a paper read to the Elektrotechnischer Verein by Drs. von Bolton and Feuerlein on January 17. The filament of this lamp is not made of carbon, but of a metal called tantalum, which was first obtained in the pure state by von Bolton. It is somewhat darker than platinum and has a hardness approximately equal to mild steel. When it is drawn into wire its tensile strength is greater than that of steel, and for the same bulk it is more than twice as heavy. At present it is fairly expensive, but as 1 lb. of the metal makes sufficient wire for about 20,000 lamps, it promises already to be a serious rival to carbon in lamp making. The filament is much longer than that used in ordinary lamps, but as only short lengths of wire are between the twenty-four supporting hooks, it is mechanically strong and can withstand rough usage. The filaments are approximately vertical, and lie on the circumference of a cylinder surrounding the central holder. When photometred, in the ordinary way, the efficiency—that is, the light given up for a

given consumption of electric power—is found to be more than double that of the best carbon glow lamps. The life tests made by Dr. Feuerlein prove that it will last in a satisfactory state as long as the best modern carbon filament lamps. The only point in the paper which is a little obscure is whether the candle-power measured is the horizontal candle-power or the total candle-power. The tantalum lamp will obviously distribute its light in a different way to the ordinary glow lamp, and thus, just as comparison between tests of the horizontal light emitted by incandescent gas burners and glow lamps may prove misleading, so also may tests of this new lamp. The only satisfactory tests of the light emitted by a lamp are by means of a Blondel lumenmeter, or by some form of integrating photometer, such as the Russell-Léonard, which is used in America. Discounting, however, possible errors from this cause, we are certain that the carbon filament lamp has got formidable rivals in the Nernst lamp (now widely used) and in this new tantalum lamp.

PROPOSED IMPROVEMENTS, LIVERPOOL.—On the 26th ult., Colonel W. R. Slacke, R.E., held an inquiry on behalf of the Local Government Board, at the Municipal offices, Dale-street, in regard to an application of the Corporation for sanction to borrow 35,000*l.* for the purchase and demolition of insanitary property under the powers of the Liverpool Sanitary Amendment Act, 1864. Mr. R. D. Cripps (Assistant Town Clerk) said that the application originally was for sanction to borrow 50,000*l.*, but the Local Government Board had granted them 15,000*l.* to enable them to get on with work that they had in hand. Under the Act of 1864, and its extensions, they had already spent 400,000*l.* in purchase and demolition. Between 7,000 and 8,000 houses had been demolished, and there were still 8,000 or 9,000 houses to be dealt with. The Corporation had given a pledge to rehouse 50 per cent. of the people dispossessed, and since they agreed to do this—October 26, 1899—4,313 persons had been provided for, leaving a balance of 158 to be still provided for under the obligation. Apparently the Corporation had not fulfilled their pledge, but in those figures, which were up to date, was included 50 per cent. of the population—663 persons—who would be dispossessed under the eighteenth presentment of the grand jury, which required 372 houses to be demolished. That work was now being proceeded with. In order that the Inspector might arrive at an opinion as to whether that pledge ought to be continued, increased, or diminished, he mentioned that the head constable made a return on December 24 showing that the number of vacant houses of 5s. a week and under on that date was 1,143, and of 20*l.* a year and under was 3,150, making a total of 4,293. Since 1901 the Corporation had demolished about 1,500 houses. The reason for the large number of vacant houses was that the Corporation had perfected their electric tram system, and there had been a large amount of building on the outskirts of the city, people being taken there cheaply. Houses of all classes were being built in the outskirts at the rate of 2,000 per year. Dr. Hope (Medical Officer of Health) and Mr. F. T. Turton (Deputy-Surveyor) gave evidence bearing out in detail the statement of Mr. Cripps. The Inspector remarked that he intended to make himself acquainted with the nature of the accommodation they provided for the people.

PROPOSED NEW FIRE STATION, JARROW.—On the 23rd ult., Mr. R. H. Bicknell, M.Inst.C.E., held an inquiry, at the Jarrow Town Hall, respecting an application of the Corporation for sanction to borrow 1,000*l.* for the erection of a fire brigade station in Wylam-street, and to provide fire extinguishing appliances. Mr. J. Petree, Borough Surveyor, said it was proposed to erect the new station on the ground adjoining the town hall, and connected with it would be telephonic communication. Mr. Petree also presented a plan of the proposed station for the consideration of the Inspector, and the inquiry closed.

Legal.

CASE UNDER THE LONDON BUILDING ACT.

AT the West London Police Court, on January 24, Mr. Henry Jordan, builder, was summoned before Mr. Garrett, one of the magistrates at the above-named Court, at the instance of Mr. F. W. Hamilton, District Surveyor for North Fulham, for having commenced certain works in, to, or upon a building, without serving a building notice, in accordance with the requirements of section 145 of the London Building Act, 1894.

The defendant had, to suit the convenience of the employers, at night time, after the premises were closed, cut an opening in the party wall dividing two shops at No. 86 and 86A, Lillie-road, Fulham, whereby the said buildings were united in contravention of certain provisions of the Act.

The defendant was fined 20s., and 2s. costs.

At the same time, the occupiers of the premises, Messrs. Leon Roberts, Ltd., were summoned for non-compliance with a notice of irregularity, served by the District Surveyor, requiring them to close up the opening cut in the party wall.

The magistrate adjourned the summons, at the defendants' request, to enable them to make an application to the London County Council in reference to certain proposed alterations to the premises.

COMBINED DRAINAGE DISPUTE.

THE case of Nathan *v.* Rouse came before a Divisional Court of King's Bench, composed of the Lord Chief Justice and Justices Kennedy and Ridley, on the 25th ult., on the plaintiff's appeal from a decision of the County Court judge of Shoreditch.

Mr. Macmorran, K.C., and Mr. Moyses appeared for the appellant, and Mr. R. Cunningham Glen for the respondent.

Mr. Macmorran said the action was brought by the occupier of one house to recover from an adjoining occupier a proportionate part of the cost of abating a nuisance under section 120 of the Public Health (London) Act, 1891. Mr. Nathan had been served by the local authority with notice to abate a nuisance caused by the escape of sewage on his premises from a drain which drained three adjoining houses, the middle house being in the occupation of Mr. Nathan, and an order was made on Mr. Nathan to abate the nuisance. Mr. Nathan did the necessary repairs to the drain on his own premises, and commenced the present action to recover a proportionate part of the expenses from the defendant (one of the adjoining occupiers) under section 120 of the Act. The County Court judge found that the whole of the money which the plaintiff claimed was for work done on his premises, and that there was no evidence to show that the defendant was liable to repair or make good the drain running from his house under the plaintiff's. As it seemed to the learned County Court judge that it was the plaintiff by whose act and default the drain allowed sewage to escape, the nuisance was not caused by any act or default of the defendant, and he gave judgment for the defendant. The learned counsel contended that, as the defendant sent sewage from his premises into the drain, he was liable to contribute under the section.

Mr. Glen, for the defendant, submitted that, as the defendant was under no obligation to repair, he was not liable to contribute to the expenses incurred by the plaintiff.

In the result, the Lord Chief Justice, in giving judgment, said he was not able to say that the finding of the learned County Court judge, that there was no evidence that the defendant was liable to repair or make good the drain running from his house under the plaintiff's, was wrong as a matter of law. There was no evidence of an obligation on the part of the defendant to repair the drain, and he could not come to the conclusion that the County Court judge was wrong in holding that there was no act or default of the defendant causing the nuisance.

Justices Kennedy and Ridley concurred, and the appeal was accordingly dismissed, with costs.

COSTS IN AN ACTION FOR DILAPIDATIONS.

THE case of Clark *v.* Cleveland came before a Divisional Court of King's Bench, composed of the Lord Chief Justice and Justices Kennedy and Ridley, on the 27th ult., on plaintiff's appeal from an order made by the County Court judge of Farnham that plaintiff should pay part of the defendant's costs in an action for dilapidations.

It appeared that the defendant was the tenant of the plaintiff, and, the house let being out of repair, the plaintiff, before the tenancy determined, inspected it and told the defendant what he required done in discharge of the covenants in the lease. The defendant employed a surveyor, and there was some communication between the surveyor and the plaintiff, but it was not until some time after the tenancy had determined that there was any definite admission of liability on the part of the defendant. Subsequently a letter was written on the defendant's behalf containing the suggestion that the parties should agree upon an independent surveyor to settle the matter. To this the plaintiff replied that a new tenant had gone into the house, and the matter must take its course. The plaintiff then brought the present action, and when it came on for hearing the parties agreed that, as it was only a question of amount, the matter should be referred. The County Court judge (Judge Russell), upon these facts, directed a reference, and made an order that the defendant should pay the plaintiff's costs up to that date.

After hearing the arguments of counsel, the Lord Chief Justice, in giving judgment, said the point to be decided was whether the learned County Court judge had a discretion and acted upon it judicially in ordering the successful plaintiff to pay the defendant's costs up to the time of an effective admission of the defendant's liability. His lordship did not think it could be said that the plaintiff's letter saying that the matter must take its course was unreasonable. He did not think that the learned County Court judge, in the circumstances of the case, had any materials on which he could properly exercise a discretion to make the plaintiff pay the costs incurred by the defendant.

Justices Kennedy and Ridley concurred, and the appeal was accordingly allowed.

Mr. Barnard Lailey appeared for the appellant, and Mr. Colam for the respondent.

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.*

219 of 1904.—W. F. COLE: *Floor Clamps.*

A device, consisting in the combination of an elongated base, a plunger arranged for reciprocatory movement longitudinally of said base, a head having a grooved face mounted transversely of the plunger at its forward end, serrated plates positively clamped upon the sides of said base, the teeth of said plates gradually increasing in length from the forward to the rear ends thereof, and mechanism mounted upon the base for advancing the plunger and locking it in advanced position.

313 of 1904.—F. W. BRITTAN and L. H. CROSS: *Locking Device for Nuts.*

A nut-securing device, wherein locking washers are employed, consisting in the provision on the washer which is to engage with the nut of one or more projections adapted to catch the nut as it is screwed down so that said washer is carried round by the nut, and also of one or more substantial ridges into, against, or between which the side face of the nut become bedded as this latter is tightened down.

2,935 of 1904.—T. E. DEVONSHIRE: *Linings for Tunnels, Subways, Lift Shafts, and the like.*

Segments for lining tunnels, subways, lift shafts, and the like, said segments being made of curved blocks of concrete reinforced by a construction of rods, wires, or expanded metal, or the like, towards the convex and concave face of the blocks, and having, between the said rods, wires, expanded metal, or the like, ribs forming part of, or extending across, a metal frame perforated with bolt holders, spaces being left for the introduction of the bolts.

3,062 of 1904.—N. G. BACON: *Window Curtain Supports and Hangers.*

A device for suspending curtains, said device consisting of a rod or arm having one end arranged to turn horizontally in a socket or in sockets so as to form a bracket, and so that the arm or rod and the curtain suspended therefrom can be swung horizontally through a semi-circle or through any part of a semi-circle.

3,113 of 1904.—J. T. NEAL: *School Desks, and the like.*

A desk provided with a pivoted top, consisting in the combination of sliding fulcra, pivoted supports, and curvilinear slots, with or without recesses, whereby the said top may be moved to and held in the various positions.

3,627 of 1904.—J. CARTWRIGHT: *Portable Fire Stoves.*

Portable fire stoves for cooking and other purposes, constructed from a few simple parts adapted for compact packing or bundling together without the use of tools, or of bolts and nuts, or other loose or independent fastening devices.

3,737 of 1904.—W. REUTER: *Means for Loading or Charging Cranes, Elevators, Conveyors, and the like.*

Cranes, elevating apparatus, conveyors, and the like, comprising a magnet or magnets for

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

gripping the material, and a holder cradle, receptacle, or conveyor band in or unto which the material is discharged, the provision of means whereby the loading magnet or magnets is or are given a swinging motion or an intermittent to and fro motion for enabling the magnet or magnets frequently to raise loads and to discharge them in or into the said receptacle or conveyor band.

4,321 of 1904.—W. ALLMAN and J. H. WATSON: *Door-closing Apparatus and Door Checks.*

This relates to door springs, consisting in the combination of a shoe secured to the lower part of the door, having a rod subject to the action of a spring, having at its forward end a lug and spindle mounted in a shallow box fixed in the floor, said spindle provided with studs or the like.

4,632 of 1904.—F. BARKER: *Locks.*

A lock guard, fitting upon the stump of lock which acts as a pivot for the levers of the lock, and also upon the stump in the lock, with a longitudinal slot therein, which allows bolt of lock to traverse.

5,076 of 1904.—G. F. LAWRENCE: *Sash Balances.*

A sash balance, consisting in the combination of a casing, a spring-operated gear wheel pivotally and adjustably suspended therein, and a locking device adapted to recede from and approach the gear wheel, such parts being respectively formed and being adapted to co-operate.

5,377 of 1904.—W. MCLAREN: *Dust Screen for Railway Carriages and other Windows.*

A dust screen wherein a piece of cheese cloth, muslin, or other desirable fabric is attached to side laths adapted to be applied to the sides of a window opening so as to stretch the fabric across the latter, the said laths being held in position by a transverse lath arranged between them.

5,389 of 1904.—G. J. COLES: *Locks or Latches.*

Locks or latches, consisting of a pivoted latch-bolt weighted to lie in its normal position, and having a projecting end adapted to engage a staple and be moved thereby out of its normal position, and to reassume its normal position behind the staple by gravity, and to be locked by a bolt engaging with the latch-bolt.

5,434 of 1904.—G. ANDERSON: *Window Sash Fittings.*

Window sash fittings, used in combination and comprising a sliding plate attached to the sash cord, and carrying a pivoted bell-crank, one arm of which is adapted to be brought under the batten rod of the window frame, and a second plate attached to the swinging sash, having an upwardly projecting pin adapted to swivel said bell-crank in swinging open and closing the sash.

5,664 of 1904.—J. W. EWART: *A Base or Wall Block to Facilitate the Erection of Electric Light Fixtures and Provide Better Insulation at their Bases.*

This invention consists of an ordinary wood or other block, to which is fitted a china or other non-conducting core or centre. Upon this non-conducting core is fixed two metal plates having suitable screw terminals, to which terminals both the line wires and the fitting wires are attached, thus obviating the necessity of the usual hand-made joints beneath the metal base of the electric light fixtures.

7,618 of 1904.—R. W. HILL: *Chimney and Ventilator Tops.*

This invention relates to chimney and ventilator tops. A chimney and ventilator top, as made in accordance with this invention, is a cylindrical or conical bonnet, open at the upper end and having apertures at different levels and at different points around the bonnet. The said apertures communicate between the interior of the bonnet and the external atmosphere. From the lower edge of each aperture is extended inwards and upwards a fixed inclined vane. These vanes deflect draught entering from without at the apertures and direct it upwards in the bonnet, thus increasing upward draught in the chimney or in a ventilator shaft or ventilator. The vanes oppose down draught and deflect the current to pass out of the bonnet through the said apertures.

14,403 of 1904.—J. E. PRESTON: *Flushing Cisterns for Water-closets and the like.*

Flushing cisterns for water-closets and the like, characterised by the combination with a flushing cistern of a ball, which is mounted to slide upon a vertical guide, and is connected with the valve or cock in such a manner that the valve or cock is actuated by the varying level of the water.

23,870 of 1904.—E. W. ROBERTS: *Glazing Bars or Astragals for Roof Lights and Windows.*

This invention relates to glazing bars or astragals, consisting of a steel tee bar with top continuation, entirely coated with an alloy of tin, having a glazing cap of pure lead, the steel bar having two grooves for the reception of packing, which is composed of asbestos.

24,337 of 1904.—F. C. ZACHARIE: *Water-closets.*

This consists in the combination with a ball, a hinged seat, an overhead flushing tank, a chain connecting the seat with the valve of the overhead tank for operating same, and a weight connected with said chain, and arranged to normally hold the seat in a practically vertical position.

24,559 of 1904.—H. G. VOIGHT: *Locks and Latches.*

A device, consisting of two plates arranged to be secured to opposite sides of a door, a knob carried by each of said plates, said knobs being in alignment, a latch slide carried by one of said plates, two roll backs co-acting with said slide, one of said roll backs being operated by one of said knobs, the other roll back being operated by the other knob.

25,380 of 1904.—J. W. HARTMANN: *Wood Columns and the like.*

A hollow column, composed of a series of staves of irregular widths, said staves being of less width at the termini than at a point intermediate thereof, to conform with the desired form of swelled column, each stave having integral locking devices upon each at an oblique angle to the radius, and parallel with the edges thereof.

25,576 of 1904.—A. H. WEGENER: *A Nut Lock.*

A nut lock, consisting in the combination with a bolt of a nut engaging the bolt and having a narrowing recess, the back wall of said recess having a groove corresponding in form to the threads of the bolt, a clutch movable in said recess, and having peripheral surfaces corresponding in form to the threads of the bolt and the groove of said recess, the said clutch being arranged to simultaneously engage the threads of the bolt and groove of said recess.

26,164 of 1904.—F. J. J. GIBBONS: *Fastening for a Door.*

A thumb-latch fastening for a door, in which the latch is pivoted to a plate which is adapted to be inserted in a mortice recess formed in the thickness of the door, and be secured to the door by an addition to, or extension of, the plate, which addition or extension covers the orifice of the recess.

26,193 of 1904.—C. W. BROWN (W. F. Warden): *Combined Ventilators and Skylights.*

This consists in the combination of a ventilator with a skylight and adjustable damper, said ventilator having vanes or louvres on the sides of the light shaft, and an outer rim or sleeve for protection from the weather, an adjustable damper by which the admission of air can be regulated or stopped without interfering with the light from the skylight.

26,284 of 1904.—E. KENNARD: *Spanners, Turnkeys, or the like.*

A spanner adapted to fit nuts with various shapes or sizes, comprising a lever piece terminating in a spigot or socket of square or other suitable section adapted to fit correspondingly shaped sockets or spigots on one end of a number of socket or key pieces, the other ends of which are adapted to fit nuts of various sizes or shapes.

3,944 of 1904.—E. LINES: *A Stoneware Pipe Joint.*

A spigot and socket pipe joint, consisting in the employment of a slot or slots on the interior of the socket adapted to receive wedges of bitumen or other suitable material between the socket and spigot.

5,353 of 1904.—J. STEWART: *Anti-Flooding or Non-Return Valves for Gully and other Sanitary Traps.*

This invention relates to anti-flooding valves for the prevention of the return of sewage or flood water through gully, intercepting, and other sanitary traps. According to this invention the valve is constructed in the following manner:—A suitably-shaped valve plate is used with a spigot on the underside; on the outer diameter of the spigot a rubber or other suitable ring is fixed; against this ring or seating a hinged flap, with a float on the underside, rises with the flood water and closes the opening, thereby preventing the flooding or return of the sewage or flood water in the area drained.

7,533 of 1904.—J. COOPER and W. WALKER: *Means for Ventilating and Humidifying Air of Spinning-rooms and other Apartments.*

An apparatus for purifying and humidifying air in spinning-rooms and other apartments, consisting of a trough for containing water, a cover to said trough forming a chamber above the water, endless bands of filtering cloth passing over rollers superposed in said chamber in such positions that the filtering cloth is dipped in the water as the rollers are rotated, a fan or other device for drawing the air through the filtering cloth, covered water troughs for receiving and humidifying the purified air, and air distributors for disseminating the purified and humidified air through the room.

11,523 of 1904.—E. STOFFLER: *Manufacture of Lime and Sand Bricks or Blocks.*

A method of manufacturing bricks or blocks of lime and sand, consisting in mixing sand and caustic lime with the addition of water or steam in open or closed vessels, and in simultaneously grinding the mixture, which is subsequently moulded and hardened with steam.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

January 23.—By GREEN & SON (Hammersmith).

Shepherd's Bush.—Wells-rd., "The Farm," with yards, stabling, and two cottages adjoining, f., e.r. 175*l.*	£2,400
Hammersmith.—11, South-st., also "Spring Cottage," with yards, etc., c., y.r. 120*l.*	2,500
194 to 200 (even), Dalling-rd. (s.), area 5,670 ft., f., w.r. 96*l.* 4s.	1,140
202 to 208 (even), Dalling-rd., area 6,645 ft., f., w.r. 97*l.* 10s.	960
Cardross-st., f.g. rents 71*l.*, reversions from 61 to 69 yrs.	1,660

By F. VARLEY & SON.

Holloway.—6, Harvist-rd., u.t. 38 yrs., g.r. 7*l.*, e.r. 42*l.*	350
Tottenham.—2 and 4, Northumberland-gr., with nursery ground, u.t. 45¼ yrs., g.r. 10*l.* 10s., y.r. 45*l.*	760

By HUNT & PEDDAR (at Needham Market).

Needham Market, Suffolk.—High-st., "The Post Office," with two residences and shop adjoining, f., y.r. 30*l.*	440
Bridge-st., a freehold cottage, y.r. 21*l.*	260
Ipswich-rd., copyhold business premises	300
Battisford, Suffolk.—"The Vale Farm," 73 a. 0 r. 13 p., f., y.r. 45*l.*	850
"Plantation Cottage" and 6 a. 0 r. 16 p., f., y.r. 15*l.*	230

January 24.—By BROWETT & TAYLOR.

Norwood.—5, 11, and 13, Rockmount-rd., u.t. 72 yrs., g.r. 22*l.* 10s., y.r. 98*l.*	510

By DAVID BURNETT & CO.

Raynes Park.—64, Lambton-rd., u.t. 92¼ yrs., g.r. 5*l.* 5s., e.r. 30*l.*	270

By C. RAWLEY CROSS & CO.

Mile End.—Mile End-rd., the "Coach and Horses" p.h., profit rentals of 60*l.* for 35¼ years, and 10*l.* for 10¼ yrs.	1,125
Plaistow.—Brooks-rd., the "Gladstone" b.h., and House adjoining, f., y.r. 50*l.*	920
Upton Park.—134 and 136, Neville-rd., f., w.r. 46*l.* 16s.	420
135 to 143 (odd), Neville-rd., f., w.r. 117*l.*	1,000
11, Stukeley-rd., f., w.r. 28*l.* 12s.	500
171 and 173, Plashet-rd., f., y.r. 58*l.* 10s.	600
Bethnal Green.—32, Coventry-st., f., w.r. 26*l.*	220
Shepherd's Bush.—230, Goldhawk-rd., u.t. 58 yrs., g.r. 7*l.*, e.r. 75*l.*	650
Stockwell.—7, Hargwynne-st., u.t. 60 yrs., g.r. 6*l.*, w.r. 52*l.*	285

By ORGILL, MARKS, & LAWRENCE (at Masons' Hall Tavern).

Islington.—Upper-st., the "Royal Mail" p.h., u.t. 54 yrs., y.r. 140*l.*, with goodwill	12,700

January 25.—By FULLER & RUDDOCK.

West Drayton, Middlesex.—41 to 44, Warwick-rd, f., w.r. 104*l.*	950

By A. PREECE & SON.

Wood Green.—90, Pellatt-gr., f., y.r. 26*l.*	300
Norwood.—10, Cambridge-rd., u.t. 56 yrs., g.r. 6*l.*, y.r. 28*l.*	200

January 26.—By C. C. & T. MOORE.

Mile End.—40, 42, 44, and 119, Moody-st., f., w.r. 109*l.* 4s.	1,040
88, Devonshire-st., f., w.r. 37*l.* 4s.	425
Bow.—1 to 5, Harley-st., u.t. 42 yrs., g.r. 71*l.*, y.r. 207*l.*	990
Harley-st., l.g.r. 98*l.* 2s., u.t. 29 yrs., g.r. 83*l.* 3s. 6d., with reversion	510
Forest Gate.—13, Earlham-gr., f., y.r. 34*l.*	490
St. George's East.—46, 48, and 48a, Dean-st., f., w.r 58*l.* 10s.	600

By NEWBON, EDWARDS, & SHEPHARD.

Holloway.—1 and 3, Cardozo-rd., u.t. 62 yrs., g.r. 15*l.*, y.r. 96*l.*	1,030
Barnsbury.—61, Albert-st., u.t. 45 yrs., g.r. 6*l.*, e.r. 36*l.*	265
Caledonian-road.—No. 82 (s.), u.t. 30 yrs., g.r. 10*l.*, y.r. 60*l.*	445
Pentonville.—27, Chapel-st., (s.). u.t. 8 yrs., g.r. 22*l.*, y.r. 65*l.*	170
28 and 29, Chapel-st., u.t. 15 yrs., g.r. 46*l.*, y.r. 130*l.*	500
Holloway.—36, 38, and 40, Campbell-rd., (s.), u.t. 73¼ yrs., g.r. 18*l.*, y.r. 93*l.* 16s.	460

By STIMSON & SONS.

New Southgate.—43 and 45, Glenthorne-rd., u.t. 77½ yrs., g r. 11*l.* 12s., y.r. 54*l.* 16s...	£350
Brixton.—371, Coalharbour-la., u.t. 61½ yrs., g.r. 6*l.*, e.r. 60*l.*	490
Old Kent-road.—317, East-st. (s.), f., y.r. 24*l.*, 50, Loder-st., with yard and stabling, u.t. 40¼ yrs., g.r. 5*l.*, w.r. 85*l.* 16s.....	375
Peckham.—5 to 10, Camden-av., f., y.r. 205*l.*	3,040
Streatham.—89, Gleneagle-rd., u.t. 90½ yrs., g.r. 10*l.* 10s., e.r. 65*l.*.....	560
Peckham.—188, High-st. (s.), f., y.r. 60*l.*	960

By G. TROLLOPE & SONS.

Belgravia.—58, Belgrave-rd., u.t. 32½ yrs., g.r. 15*l.*, p.	550

By VARLEY & LOCKING.

Stoke Newington.—220, Amhurst-rd., u.t. 42½ yrs., g.r. 8*l.*, e.r. 55*l.*	390
90, Wiesbaden-rd., u.t. 88 yrs., g.r. 6*l.* 10s., y.r. 34*l.*.....	350

January 27.—By W. B. HALLETT.

Camberwell.—24 to 32 (even), Camberwell-gr., and 45A and 47, Grove-la., area 26,700 ft., f., e.r. 600*l.*	9,000
Holloway.—34, Thane Villas, u.t. 46½ yrs., g.r. 7*l.* 7s., e.r. 36*l.*	235

By WAGSTAFF & SONS.

Bethnal Green.—11, Cranbrook-rd., and 16A and 18, Harold-st., u.t. 30 yrs., g.r. 6*l.* 10s., w.r. 55*l.*.....	350
46, 48, and 52, Usk-st., w.r. 79*l.* 6s., also l.g.r. 26*l.*, u.t. 25½ yrs., g.r. 45*l.* 10s.	300
Pitsea, Essex.—Station-parade, 10 plots of building land, also land in rear, with building thereon, f.....	400

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for offices; s. for shops; ct. for court.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

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All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

MEETINGS.

FRIDAY, FEBRUARY 3.

Junior Institution of Engineers (Westminster Palace Hotel).—A paper on "Recent Developments in Electric Lighting" will be read by Professor H. T. Davidge, Wh.Sc. 8 p.m.

SATURDAY, FEBRUARY 4.

Sanitary Inspectors' Association. — Twenty-second annual dinner, Venetian Chamber, Holborn Restaurant. 6.30 p.m.

Incorporated British Institute of Certified Carpenters (London Wall, E.C.).—Mr. G. Ayres on "The Steel Square."

MONDAY, FEBRUARY 6.

Royal Institute of British Architects.—(1) To announce the name of the person the Council propose to submit as a fit recipient of the Royal Gold Medal, 1905; (2) the President, Mr. John Belcher, A.R.A., to deliver an address to students; (3) Mr. A. N. Prentice to read a criticism of the works submitted for the prizes and studentships 1904-1905; (4) presentation of prizes by the President. 8 p.m.

Society of Engineers.—The President for the past year, Mr. David B. Butler, will present the premiums awarded for papers read during the year. The President for the year 1905, Mr. Nicholas J. West, will deliver his inaugural address. 7.30 p m.

London Institution.—Mr. M. H. Spielmann, F.S.A., on "The Wallace Collection," illustrated. 5 p.m.

Liverpool Architectural Society (Incorporated).—Mr. J. B. Fulton on "How to Attain Original Thought in Architecture," illustrated by limelight views. 6 p.m.

Glasgow Philosophical Society (Architectural Section).—Mr. D. Cook on "The Relations of Proprietor, Architect, and Contractor." 8 p.m.

TUESDAY, FEBRUARY 7.

Institution of Civil Engineers.—(1) Paper to be further discussed, "Floating Docks," by Mr. L. E. Clark; (2) time permitting, papers to be read, (*a*) "Alfreton Second Tunnel," by Mr. H. F. Crosbie Trench, M.A.; (*b*) "The Reconstruction of Moncrieffe Tunnel," by Mr. D. McLellan. 8 p m.

Institute of Sanitary Engineers, Ltd. (Lectures in Practical Sanitary Science).—Mr. J. T. Griffin on "Scavenging and Disposal of Refuse." 7 p.m.

Northern Architectural Association Students' Sketching Club.—Mr. J. Bruce on "Stresses in an Iron Roof of 40 ft. span, with all Calculations." 7.30 p.m.

Sanitary Institute.—Conference on School Hygiene, in the University of London. Address by Sir Arthur Rücker, M.A., D.Sc.

Bolton Arts' Guild.—Mr. Marshall Robinson on "Florence and the Renaissance: The later Development."

WEDNESDAY, FEBRUARY 8.

Sanitary Institute.—Conference on School Hygiene (continued).

Society of Arts.—Mr. R. Child Bayley on "Time Development in Photography, and Modern Mechanical Methods of carrying it out." 8 p.m.

THURSDAY, FEBRUARY 9.

Sanitary Institute (Conference continued)—Schools—"Building and Equipment," 11 a.m. to 1 p.m.; "Sanitary Inspection and Control," 2 p m. to 4 p.m.

Royal Institution.—Professor W. Schlich, F.R.S., on "Forestry in the British Empire," II. 5 p.m.

Leeds and Yorkshire Architectural Society.—Miss Ethel Charles on "Modern Architecture in London." 6.30 p.m.

Society of Antiquaries.—8.30 p.m.

Institution of Electrical Engineers.—(1) Conclusion of discussion on "Fuel Economy in Steam Power Plants," by Messrs. W. H. Booth and J. B. C. Kershaw; (2) "The Value of Overhead Mains for Electric Distribution in the United Kingdom," by Mr. G. L. Addenbrooke. 8 p.m.

FRIDAY, FEBRUARY 10.

Architectural Association.—Mr. C. S. Spooner on "Church Fittings." 7.30 p.m.

Royal Institution.—9 p.m.

Sanitary Institute.—Conference on School Hygiene: Training in Hygiene. 11 a.m.

Institution of Civil Engineers (Students' Meeting).—Paper to be read, "The Reconstruction of the Santa Lucia River Bridge, Uruguay," by Mr. P. J. Risdon. 8 p.m.

SATURDAY, FEBRUARY 11.

Junior Institution of Civil Engineers.—The "Coming of Age" Dinner of the Institution will be held at the Hotel Cecil at 6.30 for 7 p.m., the President, Mr. W. H. Lindley, M.Inst.C.E., F.G.S., in the chair.

Incorporated Clerks of Works Association.—Twenty-second annual dinner, Criterion Restaurant. 6.15 p.m.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.	
Hard Stocks.	1	12	0	per 1000 alongside, in river.
Rough Stocks and Grizzles	1	8	0	" " "
Facing Stocks ...	2	5	0	" " "
Shippers	2	5	0	" " "
Flettons	1	8	0	" at railway depôt.
Red Wire Cuts ...	1	14	0	" " "
Best Fareham Red	3	12	0	" " "
Best Red Pressed Ruabon Facing	5	0	0	" " "
Best Blue Pressed Staffordshire ...	4	4	0	" " "
Do. Bullnose	4	10	0	" " "
Best Stourbridge Fire Bricks.....	4	8	0	" " "

GLAZED BRICKS.

Best White and Ivory Glazed Stretchers	12	0	0	" " "
Headers	11	0	0	" " "
Quoins, Bullnose, and Flats.....	16	0	0	" " "
Double Stretchers	19	0	0	" " "
Double Headers...	16	0	0	" " "
One Side and two Ends	19	0	0	" " "
Two Sides and one End	20	0	0	" " "
Splays, Chamferred, Squints	20	0	0	" " "
Best Dipped Salt Glazed Stretchers, and Header	12	0	0	" " "
Quoins, Bullnose, and Flats.....	14	0	0	" " "
Double Stretchers	15	0	0	" " "
Double Headers...	14	0	0	" " "
One Side and two Ends	15	0	0	" " "
Two Sides and one End	15	0	0	" " "
Splays, Chamferred, Squints	14	0	0	" " "
Second Quality White and Dipped Sal Glazed	2	0	0	" less than best.

	s.	d.	
Thames and Pit Sand.....	7	0	per yard, delivered.
Thames Ballast.....	5	9	" "
Best Portland Cement	27	0	per ton, "
Best Ground Blue Lias Lime	20	0	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime.....12s. 0d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 6d. per ton at rly. dpt.

STONE.

	s.	d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1	6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1	8¼	" "
PORTLAND STONE (20 ft. average)—			
Brown Whitbed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf...	2	1	" "
White Basebed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf...	2	2½	" "

STONE (*continued*).

	s.	d.	
Ancaster in blocks	1	11	per ft. cube, deld. rly. depôt.
Beer "	1	6	" "
Greenshill "	1	10	" "
Darley Dale in blocks...	2	4	" "
Red Corsehill "	2	5	" "
CloseburnRedFreestone	2	0	" "
Red Mansfield "	2	4	" "

YORK STONE—*Robin Hood Quality.*

Scappled random blocks	2	10	" "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	3	per ft. super. "
6 in. rubbed two sides ditto, ditto	2	6	" "
3 in. sawn two sides slabs (random sizes)	0	11½	" "
2 in. to 2½ in. sawn one side slabs (random sizes)	0	7½	" "
1½ in. to 2 in. ditto, ditto	0	6	" "

HARD YORK—

Scappled random blocks	3	0	per ft. cube. "
6 in. sawn two sides, landings to sizes (under 40 ft. super.)	2	8	per ft. super. "
6 in. rubbed two sides ditto	3	0	" "
3 in. sawn two sides (slabs random sizes)	1	2	" "
2 in. self-faced random flags	0	5	" "

		s.	d.	
Hopton Wood (Hard Bed) in blocks	2	3		per ft. cube. deld. rly. depôt.
" " " 6 in. sawn both sides landings	2	7		per ft. super. deld. rly. depôt.
" " " 3 in. do.	1	2½		" "

SLATES.

in.	in.		£	s.	d.	
20 × 10	best blue Bangor		13	2	6	per 1000 of 1200 at r. d.
20 × 12	"	"	13	17	6	" "
20 × 10	first quality	"	13	0	0	" "
20 × 12	"	" "	13	15	0	" "
16 × 8	"	" "	7	5	0	" "
20 × 10	best blue Portmadoc		12	12	6	" "
16 × 8	"	"	6	12	6	" "
20 × 10	best Eureka unfading green .		15	17	6	" "
20 × 12	"	"	18	7	6	" "
18 × 10	"	"	13	5	0	" "
16 × 8	"	"	10	5	0	" "
20 × 10	permanent green		11	12	6	" "
18 × 10	"	"	9	12	6	" "
16 × 8	"	"	6	12	6	" "

TILES.

	s.	d.	
Best plain red roofing tiles .	42	0	per 1000 at rly. depôt.
Hip and Valley tiles ...	3	7	per doz. " "
Best Brosely tiles.....	50	0	per 1000 " "
Do. Ornamental tiles	52	6	" " "
Hip and Valley tiles ...	4	0	per doz. " "
Best Ruabon red, brown, or brindled do. (Edwards)	57	6	per 1000 " "
Do. Ornamental do	60	0	" " "
Hip tiles	4	0	per doz. " "
Valley tiles	3	0	" " "
Best Red or Mottled Staffordshire do. (Peakes).....	51	9	per 1000 " "
Do. Ornamental do.....	54	6	" " "
Hip tiles	4	1	per doz. " "
Valley tiles	3	8	" " "
Best "Rosemary" brand plain tiles.....	48	0	per 1000 " "
Best Ornamental tiles	50	0	" " "
Hip tiles	4	0	per doz. " "
Valley tiles	3	8	" " "
Best "Hartshill" brand plain tiles, sand faced.	50	0	per 1000 " "
Do. pressed.....	47	6	" " "
Do. Ornamental do	50	0	" " "
Hip tiles	4	0	per doz. " "
Valley tiles	3	6	" " "

WOOD.

BUILDING WOOD.	At per standard. £	s.	d.	£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in	13	10	0	15	0	0
Deals: best 3 by 9.....	13	0	0	14	0	0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11	0	0	12	0	0
Battens: best 2½ by 6 and 3 by 6 ..	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less than best		
Battens: seconds	0	10	0	" " "		
2 in. by 4 in. and 2 in. by 6 in....	9	0	0	10	0	0
2 in. by 4½ in. and 2 in. by 5 in....	8	10	0	9	10	0
Foreign Sawn Boards—						
1 in. and 1¼ in. by 7 in.	0	10	0	more than battens.		
¾ in.	1	0	0	"		

	At per load of 50 ft.					
Fir timber: best middling Danzig or Memel (average specification)	4	10	0	5	0	0
Seconds	4	0	0	4	10	0
Small timber (8 in. to 10 in.) ...	3	12	6	3	15	0
Small timber (6 in. to 8 in.)	3	0	0	3	10	0
Swedish balks	2	10	0	3	0	0
Pitch-pine timber (30 ft. average)	3	5	0	3	15	0

JOINERS' WOOD.	At per standard. £	s.	d.	£	s.	d.
White Sea: first yellow deals, 3 in. by 11 in	24	0	0	25	0	0
3 in. by 9 in.	22	0	0	23	0	0
Battens, 2½ in. and 3 in. by 7 in.	16	10	0	18	0	0
Second yellow deals, 3 in by 11 in.....	18	10	0	20	0	0
" " 3 in. by 9 in.	17	10	0	19	0	0
Battens, 2½ in. and 3 in. by 7 in.	13	10	0	14	10	0
Third yellow deals, 3 in. by 11 in. and 9 in.	13	10	0	15	0	0
Battens, 2½ in. and 3 in. by 7 in.	11	0	0	12	0	0

WOOD (*continued*).

JOINERS' WOOD (*continued*).	At per standard. £ s. d.	£ s. d.
Petersburg: first yellow deals,		
3 in. by 11 in.	21 0 0	22 10 0
Do. 3 in. by 9 in.	18 0 0	19 10 0
Battens	13 10 0	15 0 0
Second yellow deals, 3 in. by 11 in.	16 0 0	17 0 0
Do. 3 in. by 9 in.	14 10 0	16 0 0
Battens	11 0 0	12 10 0
Third yellow deals, 3 in. by 11 in.	13 0 0	14 0 0
Do. 3 in. by 9 in.	12 10 0	14 0 0
Battens	10 0 0	11 0 0
White Sea and Petersburg :—		
First white deals, 3 in. by 11 in.	14 10 0	15 10 0
" " 3 in. by 9 in.	13 10 0	14 10 0
Battens	11 0 0	12 0 0
Second white deals, 3 in. by 11 in.	13 10 0	14 10 0
" " 3 in. by 9 in.	12 10 0	13 10 0
" " battens	10 0 0	11 0 0
Pitch-pine: deals	16 10 0	20 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—First, regular sizes	40 0 0	upwards.
Oddments	28 0 0	"
Seconds, regular sizes	30 0 0	"
Yellow Pine oddments	25 0 0	"
Kauri Pine—Planks, per ft. cube	0 3 6	0 5 0
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 3 0	0 3 6
Small " "	0 2 6	0 2 9
Wainscot Oak Logs, per ft. cube.	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 9
¾ in. do. do.	0 0 7	—
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0 0 9	0 1 0
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 6
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	17 0 0	21 0 0
American Whitewood Planks, per ft. cube	0 4 0	0 5 0
Prepared Flooring, etc.—	Per square.	
1 in. by 7 in. yellow, planed and shot	0 13 6	0 17 6
1 in. by 7 in. yellow, planed and matched	0 14 0	0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	0 15 0
1¼ in. by 7 in. white, planed and matched	0 15 0	0 16 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	0 13 6
1 in. by 7 in. do. do.	0 14 0	0 18 0
¾ in. by 7 in. white do. do.	0 10 0	0 11 6
1 in. by 7 in. do. do. do.	0 12 9	0 15 0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, £ s. d.	or delivered Railway Vans, per ton. £ s. d.
Rolled Steel Joists, ordinary sections	5 15 0 ...	6 15 0
Compound Girders, ordinary sections	7 5 0 ...	8 7 6
Steel Compound Stancheons	9 2 6 ...	10 12 6
Angles, Tees and Channels, ordinary sections	7 7 6 ...	8 7 6
Flitch Plates	7 15 0 ...	8 5 0
Cast Iron Columns and Stanchions including ordinary patterns	6 12 6 ...	7 15 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON—		
Common Bars	7 0 0 ...	7 10 0
Staffordshire Crown Bars, good merchant quality	7 10 0 ...	8 0 0
Staffordshire "Marked Bars"	9 10 0 ...	—
Mild Steel Bars	8 5 0 ...	8 15 0
Hoop Iron, basis price	8 15 0 ...	9 0 0
" " Galvanized	16 10 0 ...	—
(*And upwards, according to size and gauge.*)		
Sheet Iron, Black—		
Ordinary sizes to 20 g.	9 0 0 ...	—
" " 24 g.	10 0 0 ...	—
" " 26 g.	11 15 0 ...	—
Sheet Iron, Galvanised, flat, ordinary quality—		
Ordinary sizes—6 ft. by 2 ft. to 3 ft. to 20 g.	12 10 0 ...	—
Ordinary sizes to 22 g. and 24 g.	13 0 0 ...	—
" " 26 g.	14 0 0 ...	—
Sheet Iron, Galvanised, flat, best quality—		
Ordinary sizes to 20 g.	15 10 0 ...	—
" " 22 g. and 24 g.	16 0 0 ...	—
" " 26 g.	17 10 0 ...	—
Galvanised Corrugated Sheets—		
Ordinary sizes 6 ft. to 8 ft. 20 g.	12 10 0 ...	—
" " 22 g. and 24 g.	13 0 0 ...	—
" " 26 g.	13 15 0 ...	—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11 0 0 ...	—
Best Soft Steel Sheets, 22 g. & 24 g.	12 0 0 ...	—
" " " 26 g.	13 10 0 ...	—
Cut nails, 3 in. to 6 in.	9 0 0 ...	9 10 0
(Under 3 in., usual trade extras.)		

LEAD, &c.

	Per ton, in London. £ s. d.	£ s. d.
LEAD—Sheet, English, 3lb. and up	15 10 0 ...	—
Pipe in coils	16 0 0 ...	—
Soil pipe	18 10 0 ...	—
Compo pipe	18 10 0 ...	—
ZINC—Sheet—		
Vieille Montagne ton	30 15 0 ...	—
Silesian	30 10 0 ...	—
COPPER—		
Strong Sheet per lb.	0 0 10 ...	—
Thin "	0 0 11 ...	—
Copper nails "	0 0 10 ...	—
BRASS—		
Strong Sheet "	0 0 9½ ...	—
Thin "	0 0 10½ ...	—
TIN—English Ingots "	0 1 4½ ...	—
SOLDER—Plumbers' "	0 0 6½ ...	—
Tinmen's "	0 0 8 ...	—
Blowpipe "	0 0 9 ...	—

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2¾d. per ft. delivered.
" fourths	2d. " "
21 oz. thirds	3¾d. " "
" fourths	3d. " "
26 oz. thirds	4¾d. " "
" fourths	3¾d. " "
32 oz. thirds	5¾d. " "
" fourths	5d. " "
Fluted Sheet, 15 oz.	3½d. " "
" 21 oz.	4½d. " "
⅛ Hartley's Rolled Plate	2d. " "
7/32 " " "	2½d. " "
¼ " " "	2¾d. " "

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 1 5
" " " in barrels	"	0 1 6
" " " in drums	"	0 1 8
Boiled " " in pipes	"	0 1 7
" " " in barrels	"	0 1 8
" " " in drums	"	0 1 10
Turpentine, in barrels	"	0 3 4
" in drums	"	0 3 6
Genuine Ground English White Lead	per ton	19 15 0
Red Lead, Dry	"	19 5 0
Best Linseed Oil Putty	per cwt.	0 6 6
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

TERMS OF SUBSCRIPTION.

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TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays*. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

AYSGARTH.—For rebuilding and widening Estholme Bridge, near Aysgarth, for the North Riding of Yorkshire County Council. Mr. W. G. Bryning, County Surveyor, Northallerton :—

G. R. Wade	£704 8 6	R. Stevens	£530 0 0
C. Bushby & Sons	677 0 0	G. Dougill & Sons, Aysgarth, R.S.O.*	550 0 0
W. Dinsdale & R. Moore	567 10 0		

BARKING TOWN.—For road works, North-street improvement scheme, for the Urban District Council. Mr. C. F. Dawson, Surveyor, Public Offices, Barking. Quantities by Surveyor :—

D. T. Jackson, Ripple-road, Barking* £1,149 11 2

BUNDORAN (Ireland).—For alterations and additions to Tullaghan House, Bundoran, for Mrs. Dickson. Mr. T. Elliott, architect, 37, Darling-street, Enniskillen :—

J. Harvey	£1,390 10	O'Kane	£813 0
J. Donnelly	1,180 0	W. A. Cowan, Ballinamallard*	807 10
J. Bloomfield	1,030 0		

CARDIFF.—For erecting a Sunday school at St. Catherine's, Canton, for the Rev. J. Baker. Mr. G. E. Halliday, architect, Cardiff. Quantities by Mr. J. W. Rodger, 14, High-street, Cardiff :—

R. Cox & Bardo	£933 7 0	M. W. Morgan	£820 0 0
Shepton & Sons	890 0 0	W. Symonds & Co.	819 0 0
Gibson & Sons	858 0 0	Knox & Wells	810 9 0
Blacker Bros.	853 13 9	C. C. Dunn, Cardiff*	800 0 0
S. Andrews & Sons	852 1 3	F. Small	750 0 0
A. Sims	845 18 0		
T. Bevan	835 0 0		

CHERTSEY.—For constructing two bridges known as the Plough Bridges, across the river Wey, for the Rural District Council. Mr. R. St. George Moore, engineer, 17, Victoria-street, Westminster, S.W. :—

Edwards & Co., Arundel-street, Strand, London* £3,162 5 5

[Twenty-three other tenders received.]

CLAYGATE.—For alterations to "Claygate House," Claygate, Surrey, for Mr. A. H. Jones. Mr. H. Knight, architect, London :—

C. Higby, Thames Ditton £850

ENFIELD.—For erecting a day-room at Enfield Workhouse, Chaseside, for the Edmonton Guardians. Mr. T. E. Knightley, architect, 106, Cannon-street, E.C. :—

L. & W. H. Patman	£388	Sands & Burley	£344
Almond & Son	385	S. Kind	318
T. Pearce	375	J. Thomas	292
Fairhead & Son	350		

ESHER.—For twelve pairs of semi-detached villas, Lower Green-road, Esher, Surrey. Mr. H. Knight, architect, London :—

Wheatley & Sons, East Molesey £5,000

ESHER.—For additions to "Elmfield," Esher, Surrey, for Mr. A. Barker. Mr. H. Knight, architect, London :—

Nicks & Co., Clapham Junction £2,400

EXHALL.—For erecting an infectious diseases hospital in the parish of Exhall, for the Foleshill Rural District Council. Mr. T. F. Tickner, architect and surveyor, High-street-chambers, Coventry :—

Kelbey & Son, Foleshill† £6,185 15

LONDON.—For rebuilding No. 2, Camomile-street, E.C., for Messrs. Hill & Sons. Mr. H. Knight, architect, London :—

Staines & Son £1,472

LONDON.—For alterations to the City Restaurant, for Mr. A. Schrader. Mr. H. Knight, architect, London :—

G. Kirby, Hornsey £360

LONDON.—For rebuilding Nos. 32 and 32A, Old Change, E.C. Mr. H. Knight, architect, London :—

Braid, Pater, & Co. £5,500

LONDON.—For new blocks of flats, Arlington Park-mansions, Turnham Green. Mr. H. Knight, architect, London :—

Barnes & Son, Chiswick £21,000

LONDON.—For Chelsea new Post Office :—

		Alternative tender for Shamrock stone.	Cr. old materials.
A. J. Colborn	£13,900 0	£13,790	—
J. Christie	13,645 10	13,528	£50
G. H. Gibson	13,585 0	13,500	—
C. Ansell	13,499 0	13,431	—
E. Triggs	13,188 0	13,188	—
W. J. Renshaw	12,971 0	12,871	—
J. Ferguson & Co.	12,898 0	12,873	30
E. P. Bulled & Co.	12,756 0	12,704	58
Lole & Co.	12,724 0	12,694	50
H. J. Williams, Ltd.	12,647 0	12,567	—
Stimpson & Co.	12,460 0	12,442	60
J. Mowlem & Co., Ltd.	12,448 0	12,326	—
Foster Bros.	12,438 0	12,438	—
J. Appleby & Sons	12,327 0	12,227	50
Cropley Bros., Ltd.	12,293 0	12,310	—
Leslie & Co., Ltd.	12,223 0	12,100	10
E. Lawrence & Sons	12,158 0	12,043	—
W. Johnson & Co., Ltd.	12,138 0	12,013	—
W. Willett	12,134 0	12,022	—
Martin, Wells, & Co., Ltd.	12,000 0	12,015	—
Banyard & Son	12,000 0	11,875	—
J. Smith & Sons, Ltd.	11,989 0	11,960	—
Perry Bros.	11,800 0	11,700	—
L. Whitehead & Co., Ltd.	11,778 0	11,678	—
W. H. Lorden & Son	11,749 0	11,630	—
Mattock & Parsons	11,650 0	11,550	—
W. Norton	11,514 0	11,814	—
Wisdom Bros.	11,500 0	11,380	20
C. Wall, Ltd.	11,400 0	11,292	—
J. Shelbourne & Co.	11,275 0	11,165	—
B. E. Nightingale	11,105 0	11,117	—
Galbraith Bros.*	10,990 0	10,985	—

LONDON.—For the construction of a footbridge and underground convenience at Wedlake-street, by Harrow-road, for the Paddington Borough Council. Mr. E. B. B. Newton, Borough Surveyor, Town Hall, Paddington :—

A. N. Coles, Plymouth £2,149

For Steelwork in connexion with above Bridge.

Cross & Cross, Walsall £539

LONDON.—For the erection of buildings and stores, for Messrs. Smith, Couch, & Co., Ltd., Wood Green, N. Messrs. Stephen Petts & Co., surveyors, 323, High-road, Wood Green :—

G. Robinson, Andover Works, Andover-road, N.* £131

LONDON.—For the construction of the roadwork and platelaying in connexion with the construction, for the underground conduit system of electrical traction, of the tramways authorised by the London County Tramways Act, 1904, from the existing lines in Clerkenwell-road, via Rosebery-avenue and St. John-street-road, to the existing lines at the "Angel," Islington :—

Muirhead, Greig, & Matthews	£31,619 15 6	W. Griffiths & Co., Ltd.	£29,704 1 5
J. G. White & Co., Ltd.	31,218 7 10	R. W. Blackwell & Co., Ltd.	29,149 14 6
Dick, Kerr, & Co., Ltd.	29,924 9 10	J. Mowlem & Co., Ltd., London*	27,925 0 0

[The engineer's estimate of the cost of the work is £26,432 16s. 5d.]

[Messrs. J. Mowlem & Co., Ltd., to sub-let to the undermentioned firms (or to such other firm or firms as may be approved by the engineer under the contract) the following portions of the work, namely—(1) to the Hadfield Steel Foundry Co., Ltd., of Sheffield, the manufacture of the special work (consisting of points, crossings, etc.); (2) to the Anderston Foundry Co., Ltd., of Middlesbrough, the manufacture of cast-iron yokes, road boxes, and covers; (3) to the Associated Portland Cement Manufacturers, Ltd., and Messrs. Martin, Earle, & Co., the supply of cement; and (4) to Messrs. Bayliss, Jones, & Bayliss, Ltd., of Wolverhampton, the manufacture of the tie-bars and bolts.]

TENDERS—*Continued on page* 133.

CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tenders, etc., supplied by	Tenders to be Delivered
*Erection of Buildings, etc.	Hampstead Borough Council	Borough Engineer, Town Hall, Hampstead	Feb. 2
Road Works in Streets and Passages	Manchester Paving, etc., Committee	Surveyor's Office, Paving, etc.. Dept., Town Hall, Manchester	Feb. 4
Pull. and rebuild. "The Butchers' Arms," Blackwood	Griffiths Bros.	Lansdowne & Griggs, Metropolitan Bank Chambers, Newport, Mon.	do.
Drainage and San. Work at "Dartmoor Inn," Lydford	.....	C. Cole, Architect, 50, High-street, Exeter	do.
Bridge, Storesbrook, near Ledbury	Herefordshire C.C.	A. Dryland, County Surveyor, Shirehall, Hereford	Feb. 5
Offices and Dwelling-house, Cumberland-rd., Bristol	Bristol Docks Committee	W. W. Squire, Engineer, Cumberland-road, Bristol	Feb. 6
Cleaning Out Small Reservoir at Hough-End, Bramley	.....	Jowett, Kendall, & Son, Architects, 10, East-parade, Leeds	do.
Repairs to Schools	Leeds Education Committee	Architect's Department, Education Offices, Leeds	do.
Ten Double-deck Electric Tramcars	Stockport Corporation	J. Atkinson, Borough Surveyor, Stockport	do.
Hartshill Stones	Farnborough R.D.C.	A. Fairfax, Clerk, 29, Bridge-street, Banbury	do.
Sinking, etc., Trail Shaft	Birr U.D.C.	H. Barlow, Council Office, Town Hall, Birr, Ireland	do.
Supplies, etc.	Lewisham Borough Council	Surveyor's Department, Town Hall, Catford, S.E.	do.
Steel Foot Bridge at Oldminster, near Sharpness	G. W. & Midland Rlys. Joint Comm.	Engineer at Paddington Station, London	do.
Casualty Department, Boilerhouse, etc.	Bradford Royal Infirmary	F. Holland, Engineer, 11, Parkinson's-chambers, Bradford	do.
Sand	Wakefield & District Light Rly. Co.	Belle Isle, Wakefield	do.
Carriageway in Bellahouston Park	Glasgow Corporation	J. Whitton, City-chambers, 249, George-street, Glasgow	do.
Adds., etc., Schl of Science & Art, Exhib.-bldgs., York	.....	A. Creer, Architect, Guildhall, York	do.
*Making-up Roads	Dartford R.D.C.	W. Harston, Engineer, Hythe-street, Dartford	do.
Drainage Works, Tillicoultry	Tillicoultry Town Council	Buchanan & Bennett, C.E., 12, Hill-street, Edinburgh	Feb. 7
2 acres of Storm Water Filters, Monk Bretton	Barnsley Town Council	J. H. Taylor, Borough Surveyor, Manor House Offices, Barnsley	do.
2 miles of Land Drains, etc., Sunnybank Wood	do.	do.	do.
Sinking Pit	Tirdonkin Collieries	Manager, Tirdonkin Collieries, Swansea	do.
12-in. Stoneware Pipe Sewer, etc.	East Stonehouse U.D.C.	F. A. Wiblin, Surveyor, Town Hall, East Stonehouse, Devon	do.
Wood-Paved Road and Asphalte Foot Paths	do.	do.	do.
Removing Galleries, etc., at Brithdir Council School	Glamorgan C.C.	T. M. Franklen, Clk., Glam. County Offices, Westgate-st., Cardiff.	do.
Folding Partitions at Senghenyod Council School	do.	do.	do.
Alterations, etc., at Llantwit Major Council School	do.	do.	do.
Relaying Drains at Workhouse, Erdington	Aston Guardians	C. Whitwell & Son, Architects, 23, Temple-row, Birmingham	do.
2,400 yds. Concentric Armoured Cable	Ilford U.D.C.	A. H. Shaw, Electrical Engineer, Ley-street, Ilford	do.
Safety Side Chains	Southern Mahratta Rly. Co., Ltd.	E. Z. Thornton, Secretary, 46, Queen Anne's-gate, S.W.	do.
Spiral Springs for Safety Chains	do.	do.	do.
Alterations to "Crown Inn," Crakehall	Plews & Sons	W. Hargreaves Bourne, Architect, Darlington	do.
Improvements, Church-street, Bargoed	Gelligaer and Rhigos R.D.C.	Council's Surveyor, Council House, Hengoed, via Cardiff	do.
125 tons of Steel Bridge Girders	Great Western Railway Co.	Engineer, Paddington Station, London	do.
Water Supply, Hill Court Estate, Ross	.....	H. T. Blake, Engineer, 44, Broad-street, Ross	Feb. 9
Painting External Wood and Ironwork at Workhse.	Kingston-on-Thames Guardians	W. H. Hope, Architect, Seymour-road, Hampton Wick	do.
6,500 ft. super. of 2½-in. Tooled Yorkstone	Greenwich Borough Council	Borough Engineer, Town Hall, Greenwich-road, S.E.	do.
6,500 ft. super. of 3-in. Tooled Yorkstone	do.	do.	do.
Hematite Pig Iron	East Indian Railway Co.	C. W. Young, Secretary, Nicholas-lane, London, E.C.	do.
Materials for Steel Foundry	do.	do.	do.
Brass Boiler Tubes	do.	do.	do.
Steel Palisade Fencing for Platforms	do.	do.	do.
Painting Station Buildings	North-Eastern Railway Co.	C. A. Harrison, Engineer, Central Station, Newcastle on-Tyne	do.
Three Dwelling-Houses at Middlesbrough Docks	do.	W. Bell, Architect to Company, York	do.
3,550 sq. yds. Whinsett Paving, etc.. Vic. Dock, Hull	do.	T. M. Newell, Engineer, Dock Office, Hull	do.
Warehouse, Offices, etc., Seward-street, Hull	do.	W. Bell, Architect to Company, York	do.
Four Cottages at Bolton Percy & Conversion of Bldngs.	do.	do.	do.
Buildings and Alterations at Workhouse	Stoke-upon-Trent Guardians	A. P. Miller, Architect, Frederick-street, Hanley	do.
Stores and Materials	Birm'ghm.,etc., Dist. Drain'ge Board	Board's Office, Tyburn, nr. Birmingham	do.
Forming and Metalling Carriageway, Swansea-st., etc.	Cardiff Corporation	W. Harpur, Borough Engineer, Town Hall, Cardiff	do.
Paving, etc., Footways, Swansea-st., Menelans-st., etc.	do.	do.	do.
Iron Footbridge	Staines U.D.C.	Surveyor's Office, Town Hall, Staines	do.
Road Stone	Chipping Norton R.D.C.	R. Entwistle, Surveyor, Charlbury	do.
House, Medomsley-road, Consett	Mr. G. Teasdale	T. H. Murray, Architect, Front-street, Consett	do.
School and Alterations to Wesleyan Chapel, Tibthorpe	.....	Rev. A. E. Hutchinson, 13, Alma-villa, Driffield	do.
65 tons of Cast-Iron Pipes	Barry U.D.C.	E. W. Waite, Water Engineer, Barry	Feb. 9
Supplies, etc.	West Ham Council	Borough Electrical Engineer's Office, Tucker-street, Canning Town	do
Alterations and Rebuilding Frensham Mill Bridge	Farnham R.D.C.	A. J. Stedman, Surveyor, South-street-chambers, Farnham	do.
Private Street Works, Junction-road	Leek U.D.C.	W. E. Beacham, Surveyor, Town Hall, Leek	do.
Road Material, Stores, etc.	Woolwich B.C.	F. Sumner, Borough Engineer, Maxey-road, Plumstead	do.
Stores	Dublin Corporation	Spencer Harty, Borough Surveyor, City Hall, Dublin	do.
Three Artizans' Dwellings in St. Helen's-rd., Brighton	Brighton Corporation	F. J. C. May, Borough Engineer, Town Hall, Brighton	do.
Electric Lighting on Prince's-parade	Bridlington Corporation	J. Lomas, Electricity Works, Quay-road, Bridlington	do.
Electric Lighting in Victoria-rooms	do.	do.	do.
Electric Lighting in the Town Hall	do.	do.	do.
Market Hall and Shops, Newchurch-road	Rawtenstall Corporation	J. Johnson, Borough Surveyor, Municipal-offices, Rawtenstall	do.
Labourers' Cottages	Kilkenny R.D.C.	K. Comerford, Clerk to Council	do.
Dwelling-House and Offices, Head's Nook	.....	P. Lockhart, Land Agent, Corby Castle, Carlisle	Feb. 10
Stores (for Northern Counties Committee, Ireland)	Midland Railway Co.	Mr. Ellis, Stores Superintendent, York-road Station, Belfast	do.
Materials (Granite, Gravel, etc.)	Downham R.D.C.	H. Wayman, Clerk, Union Offices, Downham Market	do.
A Test Borehole at Waterworks Pmpng. Stn., Beeston	Tarvin R.D.C.	H. B. Killon, Engineer, 20, Cooper-street, Manchester	do.
Hauling Materials	Weobley R.D.C.	F. Gwillim, Surveyor, Weobley, R.S.O.	do.
Water-tube Boiler, Steam Feed Pump, etc.	Barking Town U.D.C.	A. Hugh Seabrook, Engineer, Electricity Works, East-st., Barking	do.
400-kw. High-speed Steam Dynamo, etc.	do.	do.	do.
Improvement of Miskin-street	Rhondda U.D.C.	W. J. Jones, Public Offices, Pentre	do.
Improvement of a cross street	do.	do.	do.
Road Material	Wisbech R.D.C.	A. G. Catling, Highway Surveyor, 4, Post Office-lane, Wisbech	do.
Fifty Working-class Houses, Ashburton-park	Cork Corporation	City Engineer's Office, Municipal-buildings, Cork	do.
Offices for the City Analyst, etc., Eglington-street	do.	do.	do.
*Brick and Concrete Sewer	Westminster City Council	Works Department, Westminster City Hall, W.C.	do.
Chapel and Schoolroom, Maesycwmmer	Trustees, English Baptist Church	R. L. Roberts, Architect, Abercorn	Feb. 11
Excise Bonded Warehouse at Narberth	J. Williams	J. Williams, Wine and Spirit Shipper, Narberth, Wales	do.
Cartage of Main Road Material and Labour	Warwickshire C.C.	County Surveyor, 6, Waterloo-street, Birmingham	do.
Two Iron Verandahs to Cottage Blocks, Sedgefield	Durham County Asylum	W. Crozier, County Architect, Shire Hall, Durham	do.
Granite and Slag	East Retford R.D.C.	T. Henry, Surveyor, Retford	do.
Road Material and Cartage	Bedfordshire C.C.	County Surveyor, Shire Hall, Bedford	do.
Whinstone	Selby U.D.C.	B. McG. Gray, Engineer, Town Hall, Selby	do.
Materials	Leigh Corporation	T. Hunter, Borough Engineer, Bank-chambers, Leigh, Lancs.	do.
House and Workshop, Ford-lane, Lanchester	Weardale and Consett Water Co.	T. E. Taylor, Architect, Prospect-house, Lanchester	do.
Steps from Parade to Sands at Louisa Gap	Broadstairs, etc., U.D.C.	H. Hurd, Town Surveyor, Council Offices, Broadstairs	do.
Paving, Bristol	Sanitary and Improvement Com.	T. H. Yabbicom, City Engineer, 63, Queen-square, Bristol	Feb. 13
Two Vans for Infected and Disinfected Articles	Deptford Borough Council	Borough Surveyor's Office, 493, New Cross-road, S.E.	do.
Two Purifiers at Millwood Works	Todmorden Corporation	H. Hawkins, Gas Works, Millwood, Todmorden	do.
Materials	Salford Tramways Committee	General Manager, 32, Blackfriars-street, Salford	do.
Additions and Alterations at Moss-terrace, Elgin	.....	C. C. Doig, Architect, Elgin	do.
Scotstoun and Jordanhill Drainage	District Committee, Renfrew	W. R. Copland, C.E., 116, West Regent-street, Glasgow	do.
Wesleyan Church and School, Corfe Castle	.....	Caretaker, Wesleyan Church Vestry, Swanage	do.
*Works and Materials (One Year)	Hendon U.D.C.	Council's Engineer, Council Offices, Hendon, N.W.	do.
Granite and Slag	Potterspury R.D.C.	J. B. Fairchild, Surveyor, Potterspury, Stony Stratford	Feb. 14
Team Labour	do.	do.	do.
A 500-kw. Direct-current High-speed Generating Set	Bury Electricity Committee	S. J. Watson, Engineer, Electricity Works, Bury	do.
Gas Mains	Bangor U.D.C., Co. Down	E. L. Woods, Town Surveyor, Town Hall, Bangor	do.
Water Mains	do.	do.	do.
Reconstruction of Pier Head, Bandstand, etc.	South Parade Pier Co., Southsea	F. W. Chambers, Secretary, South Parade Pier, Southsea	do.
Business Premises, Ferryquay-street, Londonderry	Mr. A. Daly	J. P. M'Grath, Arch., Commercial-bldgs., Foyle-st., Londonderry	do.
*Generating Station at South Kensington	H.M. Office Commissioners	H.M. Office of Works, Storey's-gate, S.W.	do.
*Road and Sewer Works	L.C.C.	Architect's Department, 19, Charing Cross-road, W.C.	do.

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom advertised.	Forms of Tender, etc., supplied by	Tenders to be Delivered
Buildings at Purification Works	Combination of Rother Distillers	C. C. Doig, Architect, Elgin	Feb. 15
Chimney Stalk	do.	do.	do.
Concrete Reservoir, etc.	do.	do.	do.
Materials, etc.	Plymouth Corporation	F. Howarth, Water Engineer, Municipal Offices, Plymouth	do.
A 21-kw. Tramway Rail Return Booster	Stockport Gas, etc, Committee	A. J. H. Carter, Borough Electrical Engineer, Millgate, Stockport	do.
A 600-kw. Steam Dynamo	Leith Corporation	Burgh Electrical Engineer, Council-chambers, Leith	do.
Watertube Boiler	do.	do.	do.
Traction Switchboard	do.	do.	do.
Tools and Stores	East Indian Railway Co.	C. W. Young, Secretary, Nicholas-lane, London, E.C.	do.
Cast-Iron Pipes (5,700 and 6,000 tons), and Valves, etc.	Merthyr Tydfil U.D.C.	G. F. Deacon, Engineer, 16, Gt. George-street, Westminster, S.W.	do.
Flour-Dressing Machine, Cornwallis-road Workhouse	Guardians, St. Mary, Islington	E. Davey, Clerk, St. John's-road, Upper Holloway, N.	do.
Road Materials	Hollingbourn R.D.C.	H. J. Brackler, 33, Earl-street, Maidstone	do.
Warehouse at Central Stores, Great Horton	Great Horton Industrial S'ciety, Ltd.	J. Drake & Son, Architects, Queensbury	do.
Parochial Church, Suncroft, Co. Kildare		W. H. Byrne & Son, Architects, 20, Suffolk-street, Dublin	do.
Christchurch Tramway Extension	Bournemouth Town Council	F. W. Lacey, Borough Engineer, Municipal Offices, Bournemouth	do.
Road Works, Chadwell St. Mary, Essex	Orsett R.D.C.	F. Lowry, A.M.I.C.E., Hornchurch	do.
Street Works near Old Dock-road, Grimsby		H. C. Scaping, Architect, Town Hall-square, Grimsby	do.
*Supply of Road Materials, Royal Parks	Commissioners of H.M. Works, etc.	H.M. Office of Works, Storey's-gate, S.W.	do.
Convenience at Heaton-park	Manchester Parks Committee	City Architect, Town Hall, Manchester	Feb. 16
Granite	East Retford Borough Council	J. D. Kennedy, Borough Surveyor, East Retford	do.
Lime	Wolverhampton Sewerage Com.	W. Clifford, Sewage Outfall Works, Wolverhampton	do.
Materials	Canterbury Roads Committee	A. C. Turley, City Surveyor, Guildhall-street, Canterbury	do.
Repairs to Cottages		Gas Manager, Gas Works, Abergavenny	do.
Widening Bridge at Langsett-road, Hillsborough	Sheffield Improvement Committee	C. F. Wike, City Surveyor, Town Hall, Sheffield	Feb 17
Annual Contracts	Sheffield Highway Committee	do.	do.
Road Material	Horncastle R.D.C.	J. E. Chatterton, Clerk, Council Offices, Horncastle	do.
Rebuilding Her Majesty's Theatre, Carlisle		W. H. Beadle & W. Hope, Archs., 33, Grainger-st. W., Newc-T.	do.
Additions to Bathroom in Infirmary	Atcham Guardians	A. B. Deakin, Architect, Pride-hill, Shrewsbury	do.
*Enlargement of Sorting Office, Willesden	H.M. Office of Works	J. Wager, H.M. Office of Works, Storey's-gate, S.W.	do.
Materials	Richmond Town Council	J. H. Brierley, Borough Surveyor, Town Hall, Richmond, Surrey	Feb. 18
*Additions to Hospital	Harrow-on-the-Hill U.D.C.	ouncil's Engineer, Harrow-on-the-Hill	do.
Wiring, etc., for Electric Light of Town Hall	Leek U.D.C.	R. M. Carr, Engineer, Electricity Works, Leek	Feb. 20
Engine and Boiler Houses	Nottingham Water Committee	W. B. Starr, Architect, 12, St. Peter's-gate, Nottingham	do.
Materials	Bethnal Green Borough Council	Borough Surveyor, Town Hall, Bethnal Green	do.
Hamilton Sewage Disposal Works	Hamilton Town Council	Wyllie & Blake, C.E., 219, St. Vincent-street, Glasgow	do.
Alterations, etc., of Council Schools, Hoo	Kent Education Committee	G. E. Bond, Architect, Pier-chambers, Chatham	do.
Twenty Houses at Crumlin	Mill Brook Building Club	A. J. Bowen, Architect, Glen View, Crumlin	do.
*Making-up Roads	Beckenham U.D.C.	Council's Surveyor, Beckenham	do.
Three Sets of Gas Engines and Centrifugal Pumps	Newcastle-under-Lyme Corporation	Willcox & Raikes, Engrs., Union-chbrs., 63, Temple-row, B'ham	Feb. 22
Stoneware and Cast-Iron Sewers	do.	do.	do.
Pumping Machinery (Gt. Baddow, etc., Waterwks.)	Chelmsford R.D.C	J. Dewhirst, Engineer, Avenue-chambers, Chelmsford	Feb. 24
Widemouth Cliff-road	Stratton R.D.C. (Cornwall)	W. J. Dunbar, C.E., Liskeard, Cornwall	Feb. 25
Road Stone	Rowley Regis U.D.C.	D. Wright, Council Offices, Old Hill, Staffordshire	Feb. 27
*Heating of New Schools, Higher Broughton	Salford Borough Education Com.	C. K. & T. C. Mayor, Archs., 41, John Dalton-street, Manchester	do.
Sewage Works, Stony Stratford	Stratford and Wolverton R.D.C.	W. J. Lomax, Engineer, 11, Fold-street, Bolton	Feb. 28
Sewage Works, Wolverton	do.	do.	do.
New Offices, St. Weonard's National School		Rev. G. Whitehouse, St. Weonard's Vicarage, Herefordshire	No date.
Pair of Semi-detached Villas		Mines & Sutherland, Ltd., 65, South John-street, Liverpool	do.
Electricity Meters	Todmorden Corporation	Borough Electrical Engineer, Todmorden	do.
Ten Houses at Cononley		J. Haggas & Sons, Architects, North-street, Keighley	do.
*Painting, etc., at Workhouse	Kingston Guardians	W. H. Hope, Architect, Seymour-road, Hampton Wick	do.

PUBLIC APPOINTMENT.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Engineering Assistant	London C.C.	500*l.*	Feb. 20

Those marked with an (*) are advertised in this number. *Competitions*, —. *Contracts*, iv. vi. viii. x. *Public Appointments*, xix.

TENDERS.—*Continued from page* 131.

LONDON.—For road works (Adley-street, Trehurst-street, Meeson-street, and Maiwand-road), for Hackney Borough Council. Mr. Norman Scorgie, Borough Engineer and Surveyor, Town Hall, Hackney, N.E.:—

—	Maiwand-road.	Meeson-street.	Trehurst-street.	Adley-street.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
W. Manders	605 15 1	797 19 9	368 11 9	414 12 2
E. J. Knifton	599 3 5½	781 14 8	368 4 4	417 13 7
E. T. Bloomfield	586 13 7	768 4 3	365 11 10	394 10 3
Grounds & Newton	530 11 3½	700 3 2½	325 13 2	361 5 9
T. Adams	522 3 0	677 5 10	320 3 11	354 4 0
G. Porter	522 4 8	686 19 9	316 4 8	345 7 6
Harvey Bros.	501 9 8	642 15 4	325 12 9	336 6 9
W. Griffiths & Co., Ltd., 35-39, Hamilton House, Bishopsgate-street Without, E.C.*	483 6 6	635 19 9	293 4 4	322 13 3

LUTTERWORTH.—For Lutterworth Police Court. Mr. S. Perkins Pick, County Architect, 6, Millstone-lane, Leicester:—

J. Parnell & Son	£3,701 10 0	J. Bentley & Co.	£3,300 0 0
G. Henderson	3,590 0 0	F. Sleath	3,285 0 0
G. Mobbs	3,477 0 0	J. Rudkin & Son	3,275 0 0
T. Herbert	3,442 0 0	Leicester Builders, Ltd.	3,268 3 3
W. Moss & Sons, Ltd.	3,425 0 0	Haskard, Rudkin, & Beck	3,180 0 0
J. W. Sawbridge	3,415 0 0	T. Barlow & Co.	3,128 0 0
King & Ridley	3,380 0 0	C. Wright	3,100 0 0
H. Herbert & Sons	3,377 0 0	Storer Bros., Leicester*	3,015 6 0
T. Barker & Son	3,375 0 0		
A. Faulks	3,340 0 0		
J. H. Vickers	3,330 0 0		

LONDON.—For paving works in new streets, viz., Widley-road, Wymering-road, and Castellain-road, for the Paddington Borough Council. Mr. E. B. Newton, Borough Surveyor:—

—	Widley-road.			Wymering-road.			Castellain-road.			Widley-road. Wymering-road. Castellain-road.		
	A Flint.	B Gravel.	C Granite.	A Flint.	B Gravel.	C Granite.	A Flint.	B Gravel.	C Granite.	A Flint.	B Gravel	C Granite.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
T. Adams‡	1,006 10 10	1,061 5 10	1,170 15 10	1,177 10 10	1,241 15 10	1,370 5 10	1,848 4 11	1,957 9 11	2,175 19 11	4,032 6 7	4,260 11 7	4,717 1 7
H. Boyer	1,501 0 0	1,522 10 3	1,589 6 9	1,715 10 0	1,675 15 2	1,843 10 6	2,699 7 6	2,639 10 0	2,929 10 6	5,915 17 6	5,837 15 5	6,362 7 9
F. Fowles	1,417 19 2	1,481 16 8	1,591 6 8	1,668 8 4	1,732 13 4	1,861 3 4	2,778 1 8	2,887 6 8	2,996 11 8	5,864 9 2	6,101 16 8	6,449 1 8
S. Kavanagh & Co.	1,520 0 0	1,425 0 0	1,569 0 0	1,753 0 0	1,642 0 0	1,800 0 0	2,680 0 0	2,487 0 0	2,776 0 0	5,953 0 0	5,554 0 0	6,145 0 0
W. Neave & Son	1,321 0 0	1,230 0 0	1,376 0 0	1,545 0 0	1,437 0 0	1,609 0 0	2,473 0 0	2,291 0 0	2,582 0 0	5,339 0 0	4,958 0 0	5,567 0 0
D. R. Paterson	1,469 8 4	1,432 18 4	1,578 18 4	1,720 15 10	1,677 19 2	1,849 5 10	2,715 7 11	2,642 11 3	2,932 17 11	5,905 12 1	5,753 8 9	6,362 2 1
E. Rogers & Co., 6, St. Lawrence-road, W.	*1,265 0 0	1,210 0 0	1,455 0 0	*1,543 0 0	1,475 0 0	1,765 0 0	2,367 0 0	2,255 0 0	2,745 0 0	5,175 0 0	4,940 0 0	5,965 0 0
A. H. Strickland & Co.	1,178 10 0	1,173 11 0	1,301 6 0	1,329 7 6	1,323 7 0	1,481 5 10	2,200 0 3	2,291 7 9	2,554 18 7	4,707 17 9	4,788 5 9	5,337 10 5
Borough Surveyor's estimate of cost of executing work by contract	1,229 0 9	—	—	1,496 8 10	—	—	*2,190 12 0	—	—	4,916 1 7	—	—

‡ Withdrawn.

SOUTHALL.—For making-up roads, for the Southall-Norward Urban District Council. Mr. R. Brown, Engineer and Surveyor, Public Offices, Southall :—

—	Abbott's-road.	Adelaide-road.	Beechcroft-avenue.	Clifton-road.	Endsleigh-road.	Oswald-road.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Carpenter & Co., Ltd.	1,386 16 8	249 6 10	632 16 9	560 13 9	647 10 8	1,213 13 3
Fry Bros.	1,706 17 0	342 4 8	798 1 2	701 5 10	905 11 9	1,489 1 10
W. H. Wheeler	1,520 11 0	322 6 3	735 6 0	617 13 0	751 5 0	1,321 9 2
T. Free & Son	1,450 0 0	340 14 2	693 3 2	688 9 9	820 12 3	1,272 16 2
Boyer	1,806 14 11	392 13 11	863 4 10	718 5 11	895 11 2	1,578 4 6
Thacker	1,578 12 4	342 12 0	764 18 5	809 17 1	782 8 6	1,382 13 0
J. Macklin	1,612 3 0	381 0 3	760 11 0	692 9 5	791 10 5	1,400 16 3
Bowyer	1,709 2 9	337 13 6	791 10 0	726 12 9	1,041 2 0	1,497 0 0
A. & B. Hanson, Southall	1,434 11 8	282 2 4	677 10 7	596 13 0*	682 13 10*	1,240 0 0
T. Watson, Jun., Southall	1,388 15 1*	291 1 10	656 10 0*	602 15 4	733 13 10	1,221 10 3*
H. Morecroft, Acton	1,594 0 0	274 0 0*	689 0 0	651 0 0	797 0 0	1,361 0 0
W. Neave	1,611 15 9	328 17 1	779 1 10	664 7 4	819 6 8	1,397 12 6
Nowell & Co.	1,594 5 8	303 1 1	746 17 8	631 2 4	776 5 4	1,397 7 6
Mowlem & Co.		292 5 11	682 0 0	623 0 0	740 15 11	1,299 0 0
T. Adams	1,565 13 0	286 5 4	708 16 6	614 3 2	755 16 5	1,311 18 4

LUDLOW.—For sewerage works for the Town Council. Mr. Henry Percy Maybury, engineer, Monkstone, Buckland-road, Maidstone, Kent :—

E. Boore	£4,933 19 4	R. Davis	£2,818 18 6
Horner & Maud	4,675 17 4	H. Holloway, Wolverhampton*	2,569 0 0
H. Roberts	3,811 10 0		
J. A. Meredith	2,887 0 0		

OVER.—For alterations and additions to school buildings, High-street, Over, for the Administrative Sub-Committee for the Winsford and Middlewick District. Mr. H. Beswick, County Architect, Newgate-street, Chester :—

J. Williams & Sons	£4,963 3 7	W. Dickenson	£4,338 10 0
Exors. of H. Sergeant	4,946 0 0	S. Robinson & Sons	4,190 0 0
T.W.Meadows	4,754 0 0	J. Fowles & Sons, Winsford*	3,948 0 0
J. Mayers & Son	4,589 14 0		

OXFORD.—For the erection of a cricket pavilion, Cowley-road, for Jesus College, Oxford. Mr. R. England, Oxford, estates surveyor for Jesus College :—

S. Hutchins & Sons	£1,375
T. H. Kingerlee & Sons, Oxford*	1,263

SHERINGHAM (Norfolk).—For new premises, for the International Tea Company. Messrs. Carter & Co., architects and surveyors, Railway-approach, Sheringham :—

C. T. Baker, Ltd.	£895	J. W. Weston	£668
W. Catton	745	A. Sadler	649
W. Porter	730	G. Riches	629
H. Bullen	700	Blyth & Son*	571

SHERINGHAM (Norfolk).—For premises, for Mr. Edmonds. Messrs. Carter & Co., architects and surveyors, Sheringham :—

W. Porter	£1,930	W. Catton	£1,753
J. W. Weston	1,825	A. Sadler	1,430
G. Riches	1,800	Blyth & Son*	1,405

SUTTON-IN-ASHFIELD (Notts).—For the erection of the New Market Hotel to be situate in the Market-place, for Messrs. The Home Brewery Company, Limited. Mr. Fred. C. Martin, architect, Angel-row, Nottingham :—

J. Keeling	£2,811	C. J. Percival	£2,170
A. Eastwood & Co.	2,600	J. Greenwood	2,149
C. Vallance	2,280	Evan Bros.	2,070
F. Messom	2,180	W. Maule & Co., Nottingham*	2,030
J. H. Vickers	2,175		

WIDDALE.—For rebuilding Widdale Head Bridge, on the road from Hawes to Dent, for the North Riding of Yorkshire County Council. Mr. W. G. Bryning, County Surveyor, Northallerton :—

C. Bushby & Sons	£450 0 0	W. Dinsdale & R. Moore	£276 0 0
R. Stevens	409 0 0	J. Metcalfe, Hawes, Yorks*	223 14 8
G. R. Wade	335 3 9		
O. Dinsdale & Sons	280 10 0		

WOTHORPE.—For erecting a residence, cottage, stables, etc., at Wothorpe, Stamford, for Mr. H. V. Cobbold. Messrs. J. G. Stallebrass & Sons, architects and surveyors, North-street, Peterborough. Quantities by architects :—

Bowman & Sons	£2,999 0 0	Storer Bros.	£2,705 0 0
J. Peasgood	2,993 12 6	J. Bridgefoot & Son	2,704 1 2
G. H. Eastwood	2,979 0 0	R. Shanks	2,685 0 0
J. Woolston	2,955 0 0	J. Parker	2,683 16 6
Hinson & Co.	2,872 10 0	Nichols Bros.	2,674 19 0
Roberts Bros.	2,835 0 0	Hipwell & Co.	2,672 0 0
G. Henson	2,815 0 0	J. Guttridge	2,621 3 5
Thurley Bros.	2,802 8 2	H. Watson	2,600 0 0
J. Lucas	2,785 0 0	D. Gray	2,578 9 0
Kettering Co-operative Builders, Ltd.	2,744 0 0	Siddon & Freeman, Oundle*	2,550 0 0
		A. Lindsay	2,472 0 0

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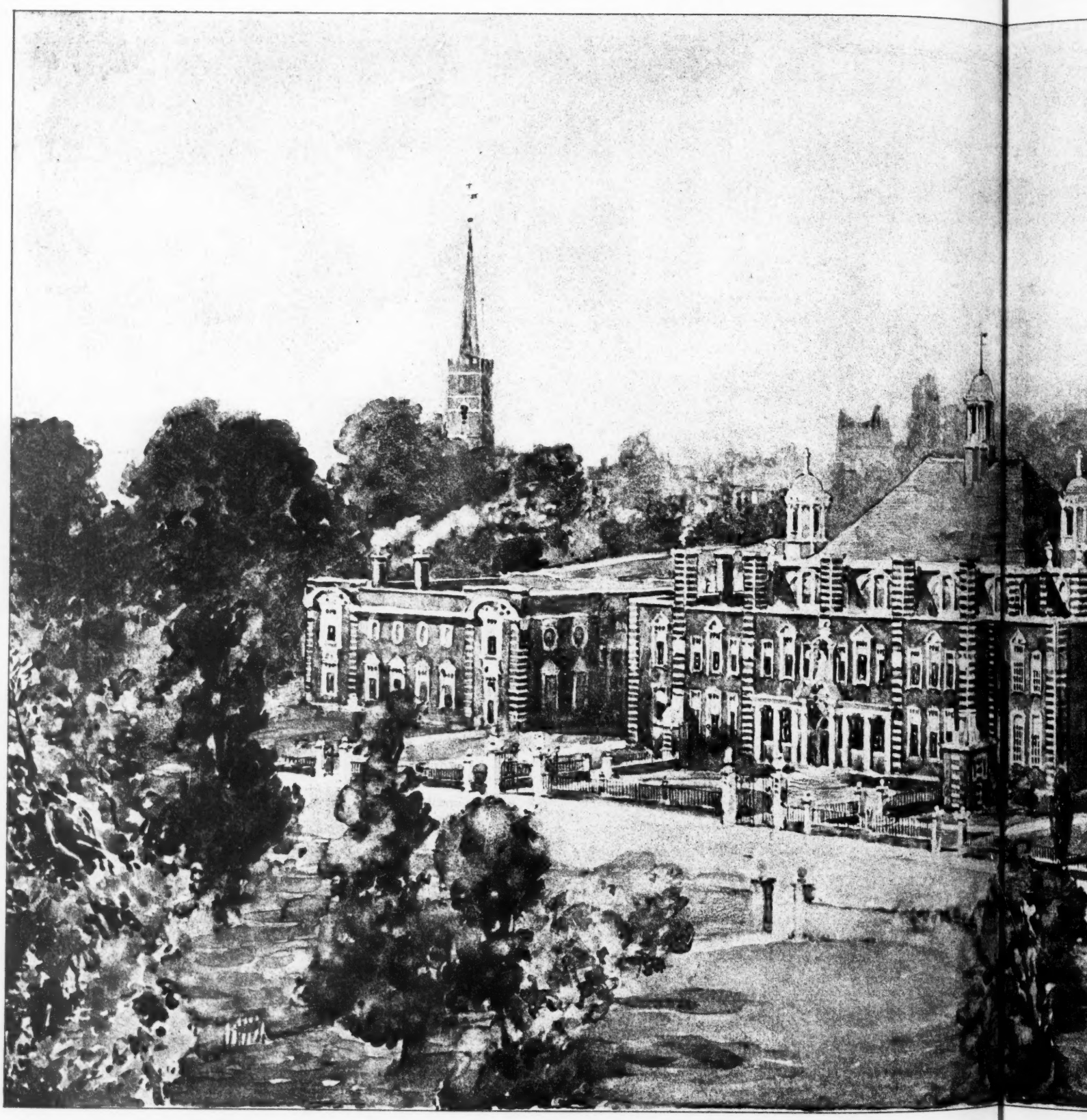

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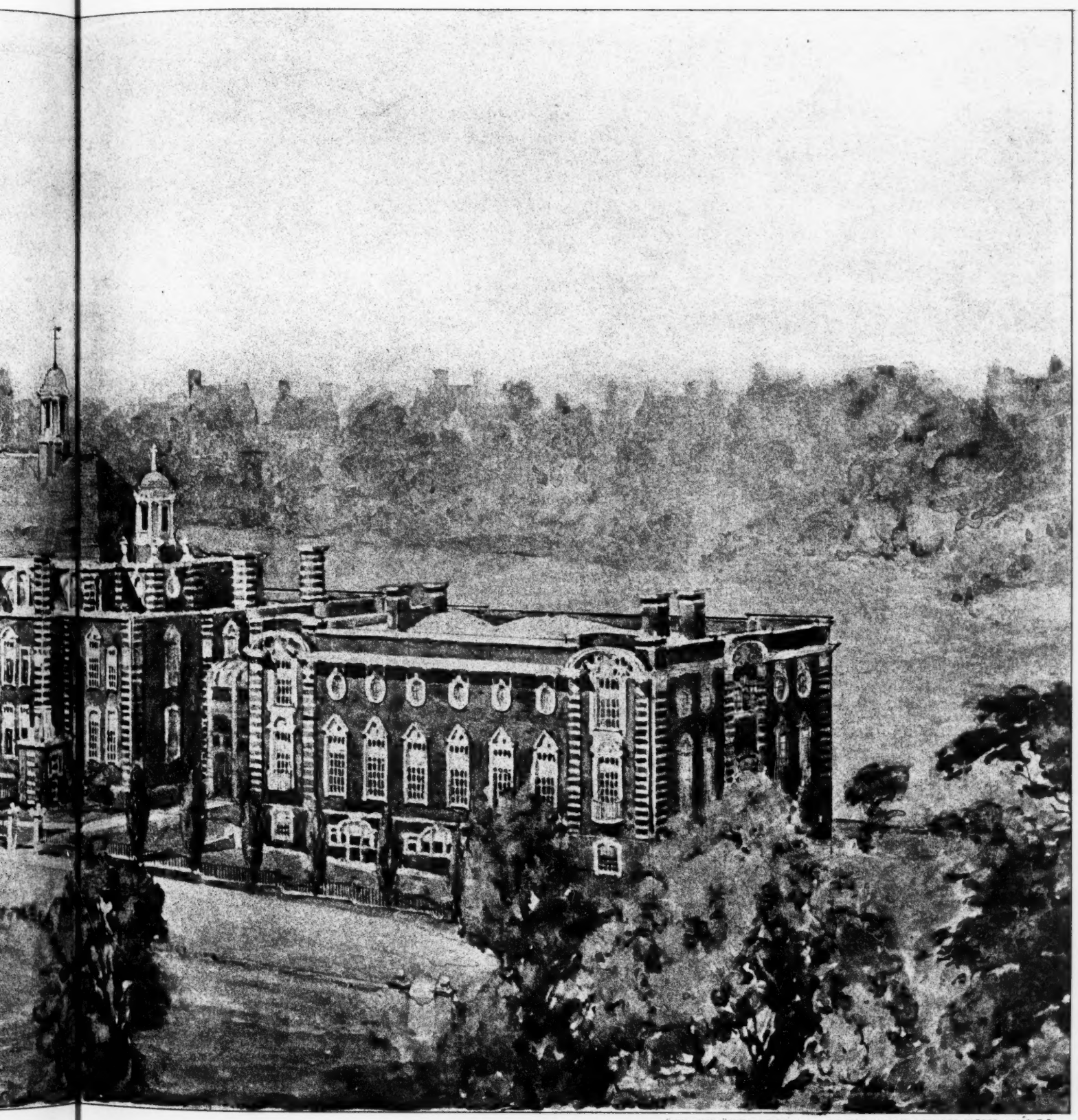

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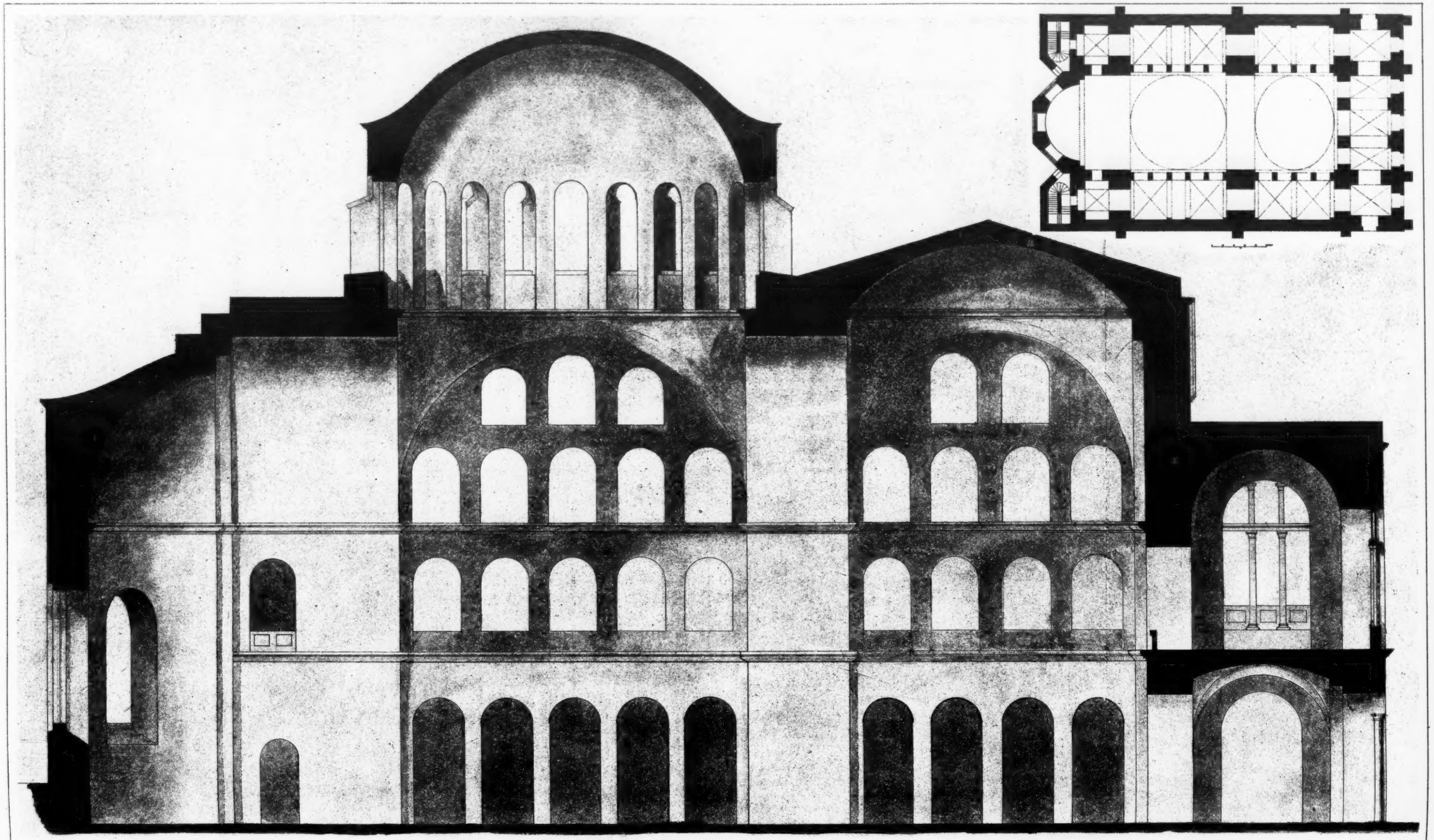

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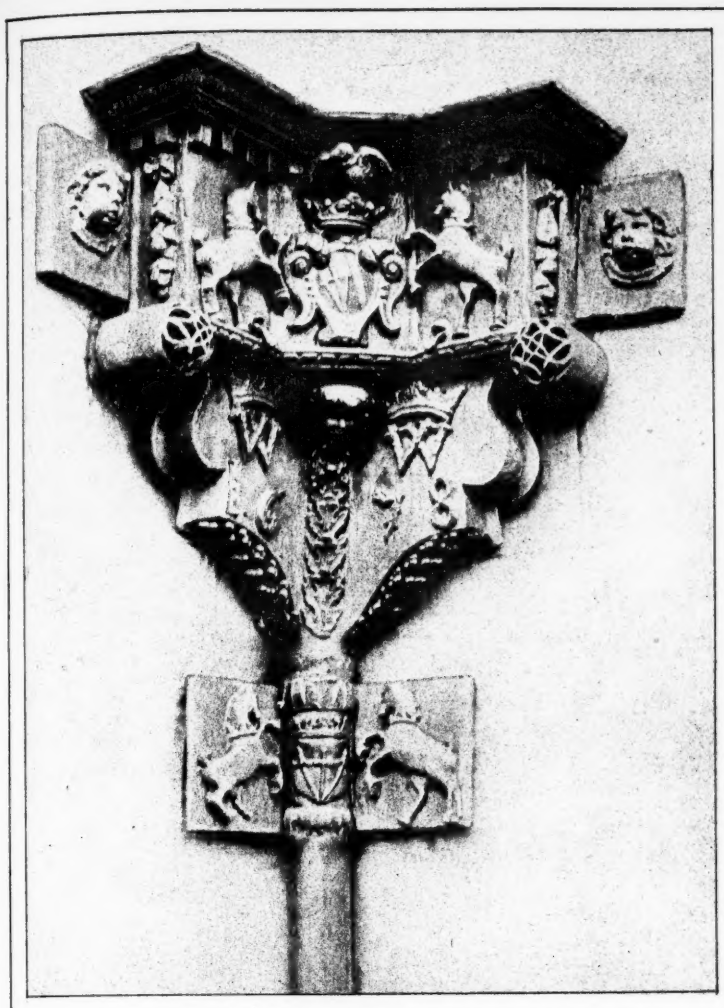

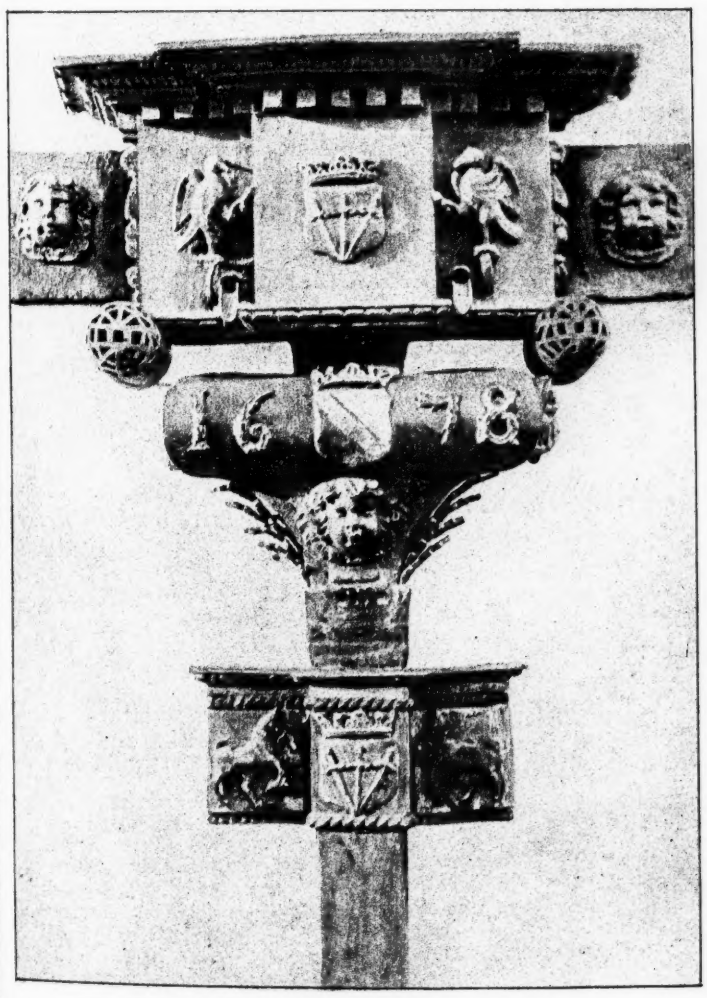

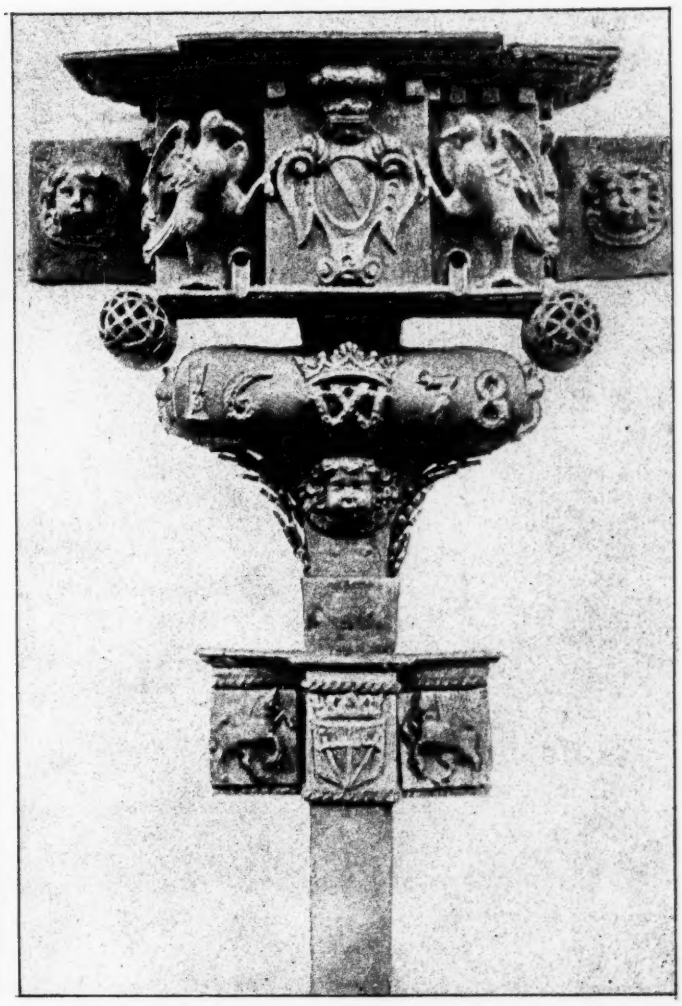

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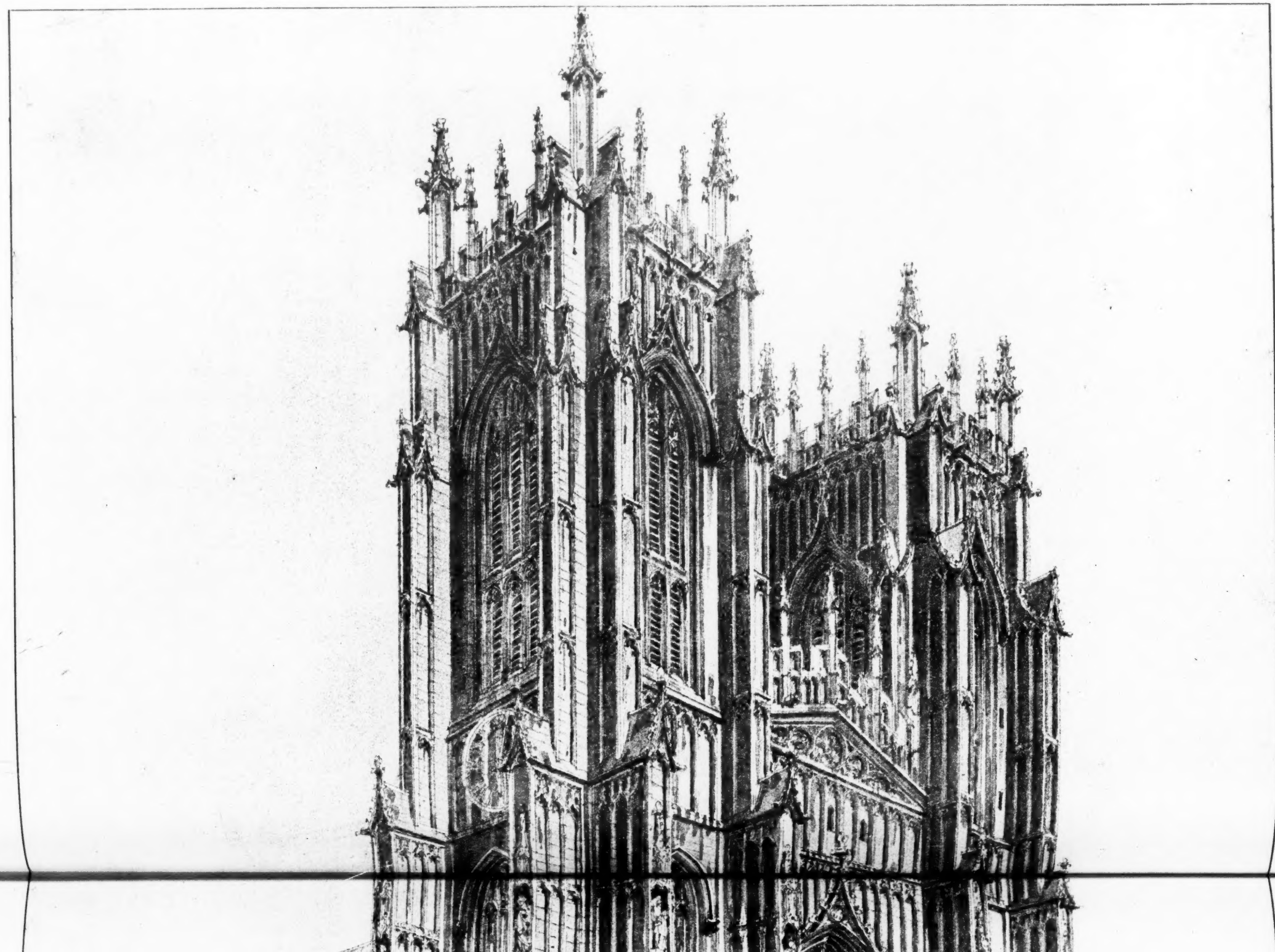

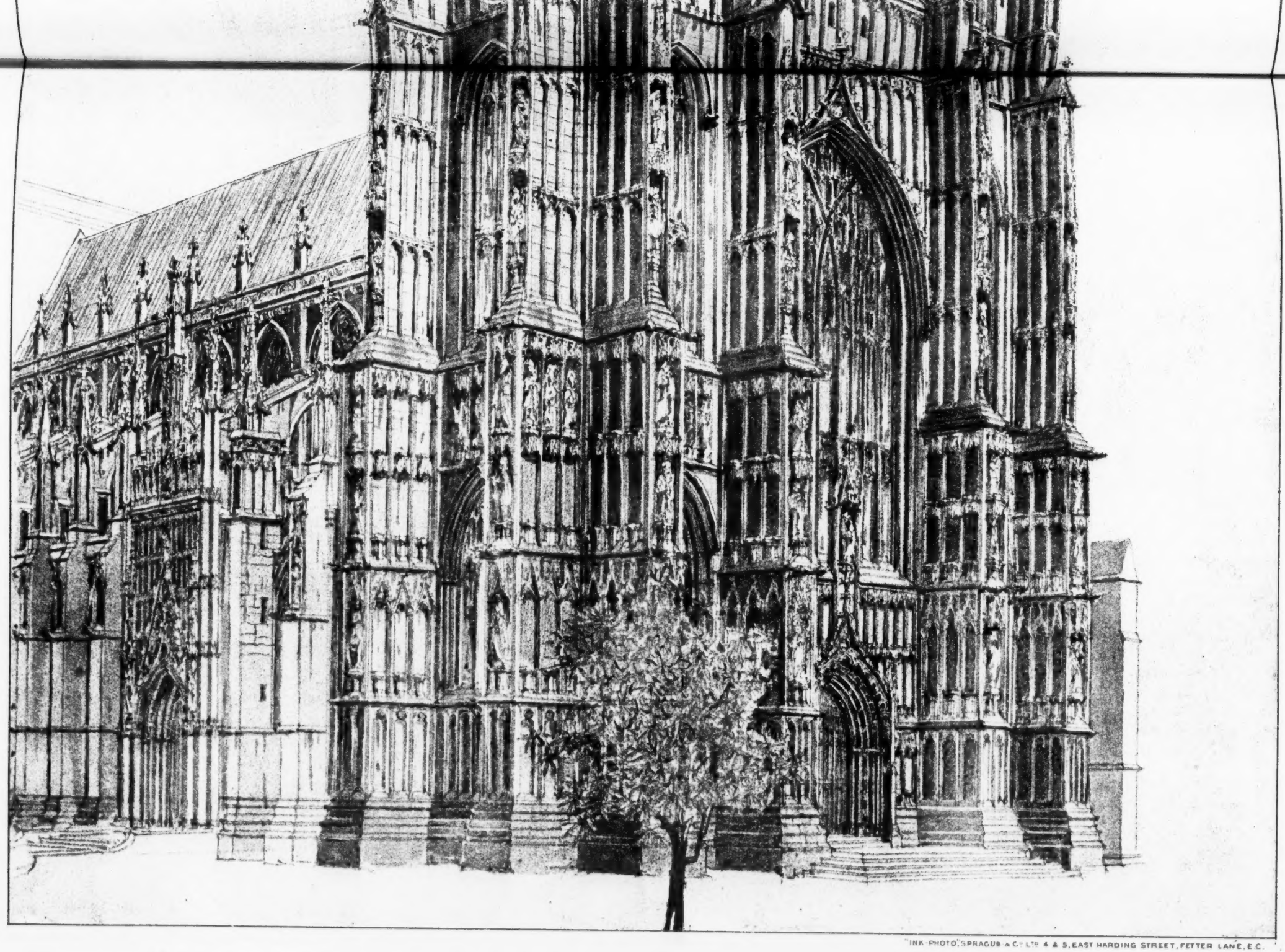

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